SEPTEMBER/OCTOBER 1996

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features

SEPTEMBER OCTOBER 1996

An American **Craftsman** 64

Quoting Kierkegaard while cutting cumaru, master floorer Chuck Crispin calls on his training as a philosopher in the struggle to create the perfect surface. By Walt Harrington

Secrets of **Shellac** 70

Shellac is a triumph of nature in an artificial age—a protective finish you can eat. Journey to India, where this amber resin from the sweat of a bug is painstakingly harvested by villagers. By Jeanne Huber

Top floors, p. 64

Victorious Lady 80

The charm of a 109 year old Nantucket dowager can blind almost anyone to her flaws. But not Steve Thomas and Norm Abram, who invite designer Jock Gifford and contractor Bruce Killen to look beneath the surface of the show's next project. By Brad Lemley

Set in **Stone** 88

Three generations of knowledge are brought to bear on a pile of rocks. The result is an elegant and permanent stone wall that seems to spring from the surrounding earth. By Jack McClintock

Life in a **Concord** Barn 94

Lynn and Barbara Wickwire realized a dream—and became celebrities—when This Old House *remade their crumbling barn into a home. Step inside this favorite project seven years later to see how it's holding up.* By William G. Scheller

Fear of **Fiberglass** 100

Is the insulation we've relied on for 60 years hazardous to our health? The tiny fibers are in the walls of 90 percent of homes in the United States, and some scientists think they're more dangerous than asbestos. By Susan Seager

Tile and Toil 106

With their gentle curves fired in deep earth tones or glazed in colors, clay tiles can turn a roof into a work of art. But these are not the sort of shingles a roofer looks forward to fixing. By Wendy Talarico

An Island **Preserved** 112

Although life on this windy sandbar has eased since the days of whalers and Quakers, Nantucket's simple style endures. Our pullout poster celebrates this Atlantic outpost's graceful dwellings and the self-reliant people who built them. By Jack McClintock

In the **Garden** 113

Inspired by the hardy Nantucket landscape, Russ Morash pays his respects to the rugged rugosa rose and admires an old seaside tradition, the shell drive.

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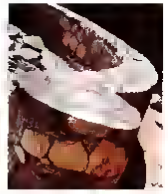
Bug juice, p. 70

Smell the roses, p. 114

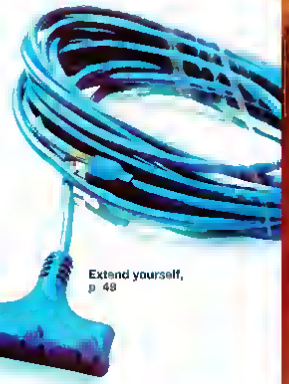


Rock for the ages, p. 88

Cover: photograph of Norm Abram and Steve Thomas by Keller & Keller

PAINTBRUSH PHOTOGRAPH BY JOSH McHUGH; FLOOR BY THIBAULT JEANSON; ROSES BY HANS LANG; STONE WALL BY DAVID BARTOLOMI. ILLUSTRATION BY M CHAEL MARKARIAN

up front



Extend yourself, p. 48

Off the Wall

The Pest-Free Life 7
Could one bad experience with a tiny bug launch a lifelong dependency on the exterminator? Oh, yes.
By Jeanne Marie Laskas

Power Tool

Zigzagger 21
A serpentine slice is easy and nice when Tom Silva wields his jigsaw. By Mark Feirer

Hand Tool

Need a Shave? 25
A light hand and a sharp scraper leave a surface so smooth you'll be certain sandpaper never touched it
By Jeanne Huber

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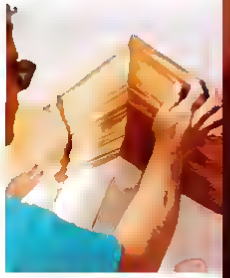
No wonder there's so little crown molding in this country. Those stately curves are more than most carpenters can cope with.
By Charles Wardell



Mighty miters, p. 33

Materials

Gap Goop 43
When the windows leak and the boards bend and the siding swells, only caulk can help. Our encyclopedia of ooze options
By Brad Lemley

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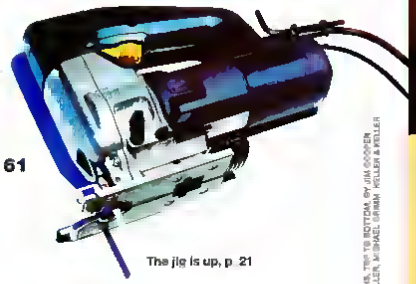
Buyer's Agents 55
Forget location, location, location—the most important thing to remember is that most real estate agents work for the seller, seller, seller. By Wendy Talarico

Plus



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Visit *This Old House* on the World Wide Web to read about our project houses, view articles online and get up-to-the minute appearance schedules for the crew www.pathfinder.com/TOH/

PHOTOGRAPHS, TOP TO BOTTOM, BY JAN COOPER, KELLER & KELLER, & ISRAEL USHAN; KELLER & KELLER

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The Pest-Free Life

Exterminators are more fun when they have nothing to do

BY JEANNE MARIE LASKAS

ILLUSTRATION BY PETER ALSBERG

One good thing about my house is that there are no bugs in it. The reason I know this is because of Mario, my pest-control technician. He comes to my house every fourth Wednesday at 6:30 a.m. with his spray can. "You don't need me," Mario will remind me every so often. "You don't have bugs." "But I do need you, Mario," I'll say. And so he'll go downstairs and spray the interior of my basement with some awful chemical that may one day cause me to grow an extra arm or eyeball or something.

The ritual has continued for seven years now, ever since I first gave Mario his charge: to do whatever he needed to make sure my life stayed pest-free. An extreme measure? Perhaps. But I had a really bad bug experience. It was a traumatizing event, one that I am not yet over. And I am not by nature a squeamish person. I grew up feeding flies to turtles. But my bug experience, which I will explain momentarily, ruined me.

First let me finish telling you about Mario. For some reason, he does not like to use the doorbell. Instead, he stands outside my bedroom window every fourth Wednesday at 6:30 a.m. and throws pebbles at it.

My dog is usually the first to hear the pebbles. "Roo! Roo! Roo!" she'll shout, all panicked. And I'll tumble out of bed and roll downstairs and let Mario in.

"Good morning, baby doll," Mario will say, handing me my morning paper. He's familiar that way. We almost never talk about bugs, seeing as I don't, actually, have any.

Instead, Mario tells me news of his life. The trip he took to Atlantic City, or the very large rat he pulled out of some rich lady's toilet. "It's still in the truck," he said one day. "You want to see it?"

No, I did not.

"Well, then, take a look at this," he said, opening his notebook. It was not a dead bug. It was a check. For $50. And it was signed, "Richard Simmons."

"Yup," he said, proudly.

"What?" I said.

"Richard Simmons," he said. "The exercise guy. He wrote this out to me."

"He did?" I asked. "Why did he do that?"

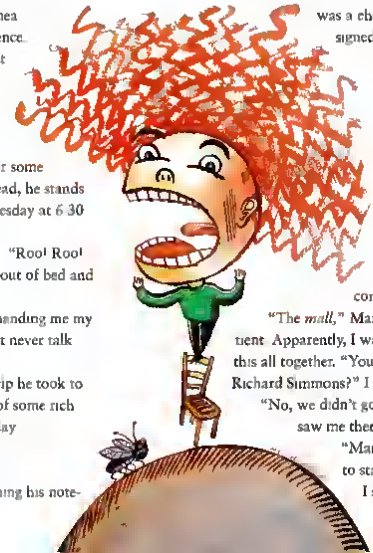
"Because of my body," he said.

I must have looked confused.

"The *mall*," Mario said, sounding impatient. Apparently, I was supposed to be putting this all together. "You went to the mall with Richard Simmons?" I asked.

"No, we didn't go *together*," he said. "He saw me there."

"Mario, you're going to have to start from the beginning," I said. And so he did.



He told me that he wes walking through the mall minding his own business when all of a sndden he heard the voice of Richard Simmons "Yon there!" said Simmons, "in the green shirt!" He motioned to Marlo, and Mario went over Snddenly, Mario found himself standing on a stage in the middle of the mall with five other men Richard Simmons was looking for the sexiest body in the mall, and Mario was asked to be a contestant The audience would vote for the winner.

"And guess what," said Mario. "I won " He said at first he didn't want to cash the check, because he didn t think anyone would believe him But then he had a brainstorm He could photocopy it

"So this is just a copy of the original," Mario said "You went one?"

"Um, sure," I said, thanking him And then Mario was gone

I get a story like this every fourth Wednesday at 6:30 a m. That, and a pest free life, all for just $34 50 a month.

Which brings us to my bug experience. Let me just say right up front that it is not one to rival the great bug experiences of the world Like the swarm of locusts in Africa that once grew to an area equivalent to the size of the United States of America Or the bug experiences that could, theoretically, happen. Like, if all the offspring of a pair of fruit flies survived and bred, the 25th generation, one year later, would form a ball of flies that would reach nearly from the Earth to the sun. Or the more impressive rodent experiences that could be happening right now, seeing as there are, in fact, 200 million rats living in America That's nearly one rat for every man, woman and child.

And since I don't have any, that means somebody out there has two.

Hey, it's survival. You have to be on top of things if you went to beat the odds of having a bug or a rodent or some other pest violate yout space. I know. I was once a victim

What happened was I was visiting my sister in New York It was a steamy summer afternoon. I was tired. I was on the couch, drifting into a nap, the cup of coffee in my hand not having done the trick I put the cup on the floor and fell asleep for about 15 minutes. I awoke "Ah, that's better " I took the last slurp of coffee

There was something that came along with that coffee. Something in my mouth Something solid and not intended for swallowing. "Yuk," I thought, and went to the kitchen sink and spat the something out

Well, I watched the something scurry toward the drain The something wes a toach A live toach I had a toach in my mouth. Yes, a roach. I had a roach in my mouth Yes, a toach. I had a toach in my mouth Yes.

Experiences like this play like a broken record, over and over again in your psyche

The event made a dent in the way I look at the world Ultimately there is no place to hide You can never be safe. Bugs are messengers Bugs are metaphors Bugs are crunchy, slimy, living reminders of the problem of evil in the world

I had a roach in my month. Yes, a roach That was seven years ago For a while after that, every bug would make me leap sky high And like I said, I am not a squeamish person I grew up feeding nematodes to salamanders I even adopted those salamanders, rescuing them from that muddy creek and housing them in the family bathtub (No, it didn't work. So then I had to make a salamander graveyard And every single salamander got a grave stone.) But now I was ruined. Every bug I saw I thought was a roach I always thought it was going to get in my mouth That was when I called Mario

There was something in my mouth. Something solid and not intended for swallowing.

"You don't need me," he said

"Yes, I do," I said And so he sprayed, and continues to spray, the magic potion in my basement that tempers my anxiety Look, some people do Prozac We each find out own way of keeping the monsters at bay

Anyway, the treatment has worked fairly well For instance, I barely even reacted, just recently, when I saw all these flying things outside on my deck. I mean, I could look at the situation rationally I could say, "Roaches don't fly So these are not roaches " Even so, I thought I should report the incident to Mario

He came right over He looked at the bugs

"Oh, my God, why didn't you call me?" he said.

"I did call you, Mario," I said

But he was worked up He took out his flashlight He went under the deck "Mud tunnels!" he screamed. "Termites!" he shouted "Oh, baby doll, why didn't you tell me?"

"What, you think I've been keeping this from you?" I said

"Big trouble!" he said, running out to his truck. He returned with a drill and a long bit, a man rejuvenated, a pest-control technician who no longer doubted his worth He put on a hat with a picture of a dead bug on it and went to work

(See Directory, page 123, for details and sources)

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These days my son is likely to be the first one to grab it. Says he prefers something that's been lived in a little. I think he kind of likes the idea of wearing the same coat that his great granddad wore. Or maybe he just thinks he'll catch more fish in it."

—Jeffrey Vose
Columbia Falls, Maine

The Vose Family. Jeffrey, Christopher, Lowell Jr. and Lowell Sr.

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SEPTEMBER/OCTOBER

WALT HARRINGTON (author, "An American Craftsman") has been an award-winning writer at *The Washington Post Magazine* for more than a decade. His 1993 book, *Crossings: A White Man's Journey Into Black America*, recounts 25,000 miles of conversations and interviews with a wide range of black Americans, from director Spike Lee, poet Ishmael Reed and corporate moguls to sharecroppers and housewives. His new collection of articles about the experiences of ordinary people, *At the Heart of It*, will be published by the University of Missouri Press in September, when he becomes a professor of journalism at the University of Illinois at Urbana-Champaign. **BRAD LEMLEY** (author, "Victorious Lady") is a writer for *The Tightwad Gazette*, a monthly newsletter on the art of frugal living. A seasoned renovator, he learned the craft of home building during six months as gofer and apprentice to the construction crews that built his Cape Cod in Bath, Maine. He currently lives with his wife and son in nearby Topsham. (E-mail: 102552.3123@compuserve.com) **IMKE LASS** (photographer, "Rugged Roses") moved to New York City from Germany five years ago to work as a freelancer. She specializes in photographing North American landscapes, as well as making portraits of writers, actors and businessmen. **PAUL DAVIS** (illustrator, Nantucket Poster) is an artist and graphic designer whose posters, paintings and drawings have earned dozens of international awards and been featured in retrospectives from Tokyo to Paris. As art director for Joseph Papp's New York Shakespeare Festival and Public Theatre, he received the first Drama Desk Award for outstanding theater posters. He is a faculty member at the School of Visual Arts in New York City. (E-mail address: pdstudio@aol.com)

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Letters

In the March/April article on gutters, you recommend painting galvanized steel to prevent rust. But it should be prepped and primed first. Paint doesn't stick to galvanizing.

—Dean Taylor, via e-mail

This Old House painting contractor John Dee agrees. Here's his technique for making paint stick: Scrub the gutters with scouring pads and mineral spirits or a liquid deglosser to remove oils and give the surface tooth. Wipe with a rag and let dry for a couple of hours. Then apply a primer for galvanized steel and let stand overnight. (Dee says solvent-based primers work better as a rule.) Finally, test the coating with a fingernail; if it doesn't scratch, it's ready for paint.

As a Realtor in Minnesota, I was dismayed to see us listed as a "buyer beware" state in your May/June article on property disclosure ["No Tell, No Sell"]. Contrary to what you said, we do have a disclosure law here.

—Sheryl Rothwell Chaska, MN

If we had simply divided the states into those with mandatory disclosure forms for sellers and those without, there would be no disputing where to put Minnesota. The Minnesota Association of Realtors says no such form is needed in your state. But we grouped them into "disclosure" and "buyer beware" states, and strictly speaking, Minnesota is neither.

Buyer beware states are those in which disclosure is not required by law and, in the event of disputes, case law consistently favors the seller. Disclosure states mandate general property condition disclosure. Minnesota requires disclosure about wells and septic tanks, and case law in the state frequently supports the buyer. More than 90 percent of Minnesota real-estate agents also use the state's voluntary disclosure form, which National Association of Realtors general counsel Laurene Janik says "still holds the seller responsible if he knowingly misrepresents information."

How can I find out more about the centralized ventilation system you installed in the Savannah house attic?

—Del Zogg, via e-mail

A single fan in the attic was used to ventilate both the laundry room and the master bathroom. Putting the motor in the attic cut down on noise, and the system required only one exhaust vent to the outside. The dual-point ventilation kit was designed by Fantech, 112 Northgate Boulevard, Sarasota, FL 34234; 800-747-1762.

I thoroughly enjoyed revisiting Levittown through your photo essay [March/April]. My first visit was as a girl staying with my newly married aunt and uncle, when Levittown was so hot that the telephone company couldn't keep up with installations and many homeowners had to use free phone booths set up on the street. I remember getting lost trying to navigate by the abundant—but identical—landmarks. I was happy to see from your article how interestingly and gracefully Levittown has aged.

—Karen Hartrampf Atlanta, GA

punch list

***definition.* a list of items incorrectly done or remaining to be fixed on a construction job**

- The photograph on page 1 of the July/August issue was incorrectly credited. The photographer was Josh McHugh.
- The March/April article on "Low Country Air Conditioning" incorrectly reported that it takes 12,000 Btus to melt a ton of ice. In fact, it takes 12,000 Btus per hour over a 24-hour period, a total of 288,000 Btus.

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extras

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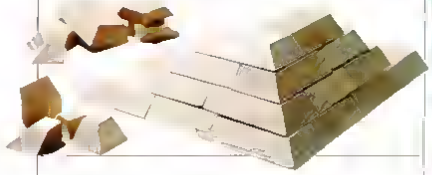
or e-mail
letters @ toh.timeinc.com

This Old Pyramid

Attention Egyptologists in training. NOVA Curiosity Kits has an addition called "Take an Egyptian Adventure," which gives children an opportunity to learn the history and mysteries of ancient pyramid construction by building their own. While some Egyptian pyramids were made with more than 2½ million blocks of limestone and reached heights of 500 feet, the kit, yielding to space and time constraints, contains 78 wooden blocks that reach a height of 5 inches. Kids can also carve and paint their own hieroglyphic messages, create their own mummies and decide what goodies to bury them with.



How's the Weather Up There?

Yes, tall people are lucky—they can walk faster, they can eat more without gaining weight and they can see where they're going in a crowd. But there are also disadvantages. Sleeves, beds and houses are too short. Ask Lisle Bean, a 6-foot-8-inch architect who heads the National Institute for Tall People. Bean's beef: Buildings are built for average people. Countertops, door headers and showerheads are too low. And tall people must duck every time they enter a basement. Bean is trying to raise the sights of architects, manufacturers and those who write building codes. So far he has succeeded in getting the American National Standards Institute, which sets voluntary manufacturing standards, to investigate some of his ideas—among them 84-inch-tall doorways and 42-inch-high countertops. He's also working on a guide to tall-person design but needs volunteers willing to be measured as they stand, sit and reach. Those interested can contact Bean at 703 823-0456. To qualify, women must be at least 5-feet-8, men at least 6-feet-2.

A new British-made model, left, is so large (7½ inches long), it comes with a molded plastic holster. Center button tightens blade to hold it firm while cutting.

Blades on the Hyde 42046, below, snap off along a scored edge when they become dull.

PYRAMID PHOTOGRAPH BY HANNA RAYHAD
UTILITY KNIVES BY MICHAEL CRAIG

Rubber grips on Model 10-779, above, make the knife easier to hold. A screwdriver is required when changing blades.

This Better Tools knife, right, is named for its color and shape. The 19-degree bend in the handle means more power in each cut. Grip swings open for no-tool blade changes.

The original utility knife, No. 199, below, is virtually identical to the 1937 version—compact and simple.

Fiskars' PowerGrip, left, has a protective knuckle-duster grip and an easy-access storage compartment that holds three replacement blades.

Cut it out!

Utility knives, like utility infielders, didn't start out as jacks of all trades. Stanley Tools' knife No. 199 was the first one (introduced in 1937), but it was heralded as a specialized cutter for fiberboard. The 199 had a cast-aluminum handle decorated with antislip checkering (like that on period gunstocks), which, in tandem with its rigid blade, permitted accurate cutting. Users soon found the 199 could go beyond fiberboard to slice roofing felt, insulation and even sheet tin in a pinch, so it was promoted to "trimming knife" in the company's 1939 catalog. Fifteen years later, after 199s cut their way through thousands of dungaree pockets, Stanley introduced a retractable-blade model. Over the years, utility knives have acquired a degree of sophistication far beyond the 199's humble beginnings. There are knives with blade storing handles, tool-free blade changing, brightly colored "designer" casings and cocked handgrips for comfort and leverage. The latest versions have locking mechanisms that keep retractable blades from wobbling. Despite the advances, plenty of renovators clamor for the old classic 199, which is still manufactured but now called Model 10-209.

(See Directory, page 123, for details and sources)

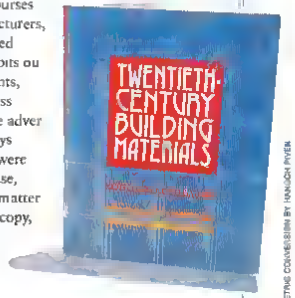
Active-noise-reduction headsets resemble personal stereos, but they minimize noise instead of creating it.

Hush *Maker*

The new pollution—as if we needed another—is noise, always irritating and sometimes dangerous because of the distraction and fatigue it causes. We've long had earmuff-like passive protection, but in recent years active noise reduction (ANR) has taken off—literally, in some cases, because it's popular with pilots of small planes. (One commercial carrier provides ANR headsets to passengers.) These devices use a microchip to generate sound-wave patterns that are mirror images of incoming waves; the two cancel each other out. The result isn't silence but a significant reduction of low-level noise. We tried them, with mixed results. In the workshop, the set can't react fast enough to eliminate impact noises such as hammering, and it doesn't cut down much on high-pitched sounds from screaming saw blades. But it was just right for covering up the drone of an old power lawnmower. Some wearers feel pressure in their ears when they first don the headset. That's the unit's sound-wave energy waiting to go to work. Noticeable during lulls, it disappears when the headset hes noise to cancel.

Material World

Anyone who's wondered where Masonite comes from, what fiberboard is made of or when concrete blocks were invented can now find the answers to these and other mysteries in *Twentieth Century Building Materials*. Each chapter (there are 36) is devoted to a material that was developed, gained prominence and sometimes met its demise in the last 100 years. The dry-as-sawdust prose includes lengthy discourses on inventors, manufacturers, problems and suggested cures, plus quirky tidbits on subjects such as sealants, cork tile and plate glass. Leavening the text are advertisements from the days when these products were new and full of promise, reminding us that no matter how seductive the ad copy, performance claims should be taken with a dose of skepticism.



HEADSETS' ANR BOOK BY DARWIN HADRAP; MEETING CONVERSION BY RANDOLPH RYDEN

"Finding one's way through a **building design** is much like finding one's way across a **canvas**."

Vincent Scully

Events & Appearances

■ **THE ASSOCIATION FOR PRESERVATION TECHNOLOGY INTERNATIONAL** holds its annual conference September 26-29 in Winnipeg, Manitoba. For information, call 217-333-1860.

■ **LEAD DETECTION AND ABATEMENT** are the featured subjects at the nation's largest lead-poisoning-prevention conference, October 7-9 in Washington, D.C. More than 100 speakers are scheduled to participate. For information, call 301-913-0115.

STEVE THOMAS

September 21-22 in Cincinnati, OH
Huntington Banks Kitchen, Bath and Design Show
Cincinnati Convention Center, 513-281-0022

September 26 in Findlay, OH
Public lecture sponsored by Northwest Ohio Title Agency Inc. at Central Auditorium, 419-422-8763

September 27 in Grosse Ile, MI
Public lecture to benefit the Downriver Council for the Arts
Grosse Ile Golf and Country Club, 313-281-2787

September 28 in Edison, NJ
Home Decorating and Remodeling Show
New Jersey Convention Center, 908-919-1800

October 25 in Akron, OH
HBA Ideal Home Show
John S. Knight Center, 800-865-9859

October 26-27 in Fort Wayne, IN
The Fall Home Show
Memorial Coliseum, 800-678-6652

NORM ABRAM

September 21-22 in Chicago, IL
American Woodworkers Convention
Chicago Navy Pier, 312-595-5000

WEED TORCH AND PATENT MODEL BY DARWIN HADRAP; FLOOR COURTESY KENTUCKY WOOD FLOORS

Admit it. Weeds piercing a pathway or anthills rising in the flower beds make you long for virulent defoliants and pesticides, despite their effect on the environment. One equally satisfying solution: Nuke 'em with the BernzOmatic Outdoor Torch. Available at hardware stores, the torch is really nothing more than an aluminum tube bent like a cane with a burner head at one end and a fuel cylinder at the other. The flame is fueled by propane gas or MAPP, a methyl acetylene/propadiene mix. The torch's 34-inch length lets users incinerate insects and annihilate weeds without bending over, an altogether civilized and more environmentally benign way to demonstrate dominance over nature.

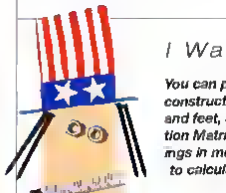
WEED Warfare

Hail *and* Hardiness

Hailstones are tough on roofs. They dent them, crack them, even punch holes in them. That costs homeowners billions of dollars in repairs each year. Now United Laboratories has a rating system that tells homeowners how various roofing materials will stand up to ice pellets. The materials are tested by showering them with steel balls of four different sizes. Roofing with a Class 1 rating is least resistant to damage, while materials with a Class 4 can ride out a serious storm with little discernible harm. To find out the rating, check the manufacturer's literature or ask a roofing contractor.

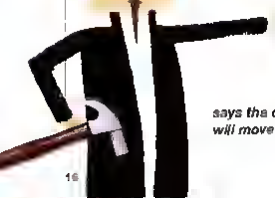
Patented Clever Ideas

Made tiny, even mundane items are intriguing. So imagine the appeal of miniatures that illustrate new ways of thinking. The United States Patent Model Foundation is selling original scale models of inventions, ingenious and silly, submitted to the U.S. Patent Office for consideration between 1836 and 1880. Back then, the office required models no larger than 12 inches square for all applications. Many of the models were destroyed in a fire or have already been sold to collectors, but the foundation has rounded up some of those that remain and is offering them for sale. The proceeds will be used to show the rest of the collection in schools and museums around the country to inspire young inventors. The models don't come cheap — we paid $175 for this one of a gate that opens and closes by pressing on a metal wand linked to a spring. It was the brainstorm of Samuel Small of Clay Township, Indiana, who submitted the model in 1879. The original handwritten tag noting it as Patent No. 221,368, granted November 4 that year, is attached.



I Want You to **Convert!**

You can practically watch people's eyes glaze over when talk turns to the construction industry's conversion to metric. What's wrong with inches and feet, anyway? Plenty, according to the federally authorized Construction Metrication Council. Almost everyone else in the world designs buildings in meters and millimeters, for starters. Also, metric figures are easier to calculate. The council has been successful in getting those who build large federal projects to go metric. And where the federal government leads with its $50 billion-a-year construction budget, others will follow. But the conversion triggers changes in standard sizes of materials from plywood to doors. Even the 2x4 isn't safe—there's talk of renaming it the "38 by 89." Council chairman Tom Rutherford says the conversion will take place first in commercial construction, then will move to the homeowners' arena within the next 10 years.



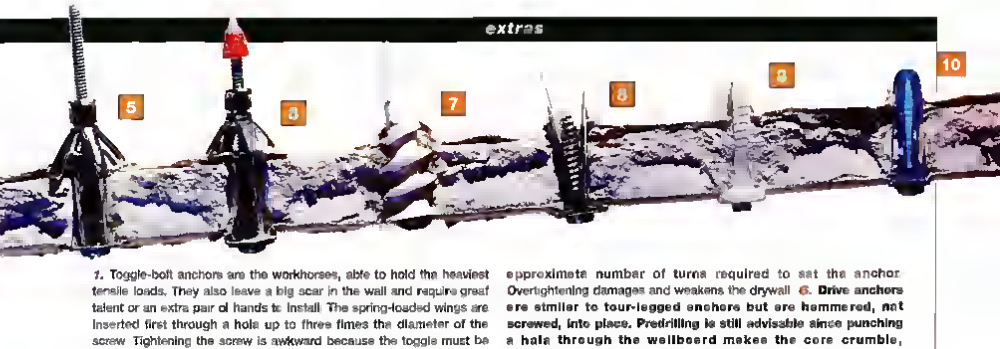
Kentucky Wood Floors conducted its own straw poll by displaying this Clinton-Dole floor, made from nine different woods, of a recent trade show. Attendees were asked to "vote" by stepping on their favorite face. Their choice? Impossible to tell, according to president John Stern, who says people stomped on both mugs with equal glee.

(See Directory, page 123, for details and sources)

Anchors Aweigh

Little more than a paper-and-gypsum sandwich, wallboard must often bear hefty loads—bookshelves, towel bars and artwork, to name a few. Drilling through wallboard into a stud is always best, but when a good stud is hard to find, try a drywall anchor. These come in three types: toggle anchors that clamp against the drywall, screw anchors with deep threads that embed themselves in the wall and expansion anchors that expand as a screw or nail is driven in. Manufacturers rate their anchors for sheat (pulling sideways) and tensile (pulling out) loads. Don't look for the ratings on the package; they're seldom included. Call the manufacturer or check the catalog instead. Anchors should be able to hold four times the weight of the object being hung, but remember that even the best anchor can't exceed the strength of the drywall. When mounting, don't place anchors too close—no less than 10 anchor diameters apart for expansion types. And measure carefully before sinking the anchor. Adjustments after the fact are almost impossible, and the bangers leave gaping holes in the wall.

E-Z Toggle [3] is our favorite.



1. Toggle-bolt anchors are the workhorses, able to hold the heaviest tensile loads. They also leave a big scar in the wall and require great talent or an extra pair of hands to install. The spring-loaded wings are inserted first through a hole up to three times the diameter of the screw. Tightening the screw is awkward because the toggle must be pulled taut against the board while turning. If the screw is removed, the toggle drops behind the wall, gone forever. *2.* **This plastic toggle anchor tucks into a point and fits through a small pilot hole, then opens like a flower. But if the drywall is too thick, the toggle won't open at all, so its holding power is nil.** *3.* We like this toggle because it's one of the simplest anchors to install (no predrilling required). It's also among the strongest. The toggle opens automatically when the screw is inserted. *4.* **This toggle anchor does the least damage to the wall, requiring a hole just large enough to insert a slender nylon stem.** *5.* This four-legged toggle anchor spleys as the screw is tightened but works only on the wallboard thickness it's rated for. Check instructions for the approximate number of turns required to set the anchor. Overtightening damages and weakens the drywall. *6.* **Drive anchors are similar to four-legged anchors but are hammered, not screwed, into place. Predrilling is still advisable since punching a hole through the wallboard makes the core crumble, compromising the wall's strength.** *7.* Threaded anchors are quick to install, require no predrilling and can be removed and used again. Their holding power ranks below the toggle bolts but above expanding anchors. *8.* **This expanding anchor is hammered in, leaving only a slit in the wallboard if it's ever removed. A lot of torque is required to drive the screw and spread the metal wings.** *9.* Nail-in anchors provide more holding power than nails alone but can't handle heavy-duty loads. They are most commonly used on masonry. *10.* **A plastic expansion anchor leaves only a small hole in the wall when it's removed, but a wrong-size screw or pilot hole will render one of these useless. Of all the anchors we surveyed, these last two types offer the least holding power.**

ANCHORS AWEIGH BY MARIAN HARMAN. TOOL ART BY JOEL SNYDER. TURNABOUND BY GARY MEEK. CHILDREN'S MUSEUM BY KELLER & KELLER.

Tools, Beautiful Tools

Tools as art—as the subject and substance of sculptures, paintings and photographs—make sense to John Hechinger. His family owns a chain of home centers so he is immersed in the proletarian aspects of tools every day. Why not celebrate their aesthetic value as well? In the late 1970s, Hechinger began collecting tool related works by well known 20th-century artists, including Fernand Léger, Claes Oldenburg and Jim Dine. Displayed in the book *Tools As Art*, the collection proves that artists belong in wood shops as well as studios. Among the 240 examples are visual puns (*School of Fishes* is dozens of silvery wrenches), irony (the *Zen Saw*, made of rice paper and balsa wood slices serenely through a block of stone) and hard-edged compositions, such as *Still Life with Tenon Saw*. Which tools inspired artists most? Hammers and wrenches are popular, but what really excited them was saws. Plain or fancy, manual or power, they loom large in many of the works.

Reader's Turnabout

Remember that fifty car turntable we featured in the May/June issue? Turns out it was a case of reinventing the wheel. Al Hartl, construction manager for Brian Johnson Landscape in Pasadena, California, wrote to tell us about this turntable in San Marino. Built in 1930, the homemade wooden deck rides on a circular steel rail and is driven by a ¼-horsepower motor connected to a speed reducer connected to a chain. Hartl's crew recently automated the system so the owner could stop and start the device using a common garage-door remote-control unit. Fun, huh? And clever. So clever we figure there must be lots more of these gadgets out there. Send us photos of yours!

Less Labor Limb Lopper

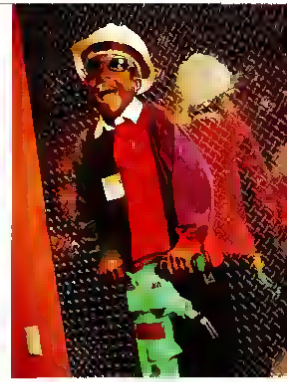
Lopping shears are customary for arboreal amputations, but they're heavy and clumsy. This model, which weighs only 14 ounces and is less than 18 inches long, is easy to handle and able to cut branches up to 1¾ inches thick. The tool is made entirely of a nylon-fiberglass composite, except for the stainless-steel blade.

"In choosing a **contractor**, the only way to judge him is to look carefully into his **previous work.**"

Frank Lloyd Wright

Future Norms of America

When children from the Chandler Community School in Worcester, Massachusetts, visited a new building exhibit at the Boston Children's Museum recently, the most popular piece of equipment was the Bobcat. The tykes swarmed over it, making engine noises and shifting gears. A jackhammer with a realistic—but blessedly softer than usual—sound was also a favorite. A little problem-solving was called for as one budding architect, upon completing his first house, realized there were no doors or windows. The "site" includes the shell of a construction trailer and a rafter ringed by skyscraper views.



(See Directory, page 123, for details and sources)

Let me tell ya, there's a lot of Life in my Ace Hand Tools...

Ah my hammer over the past ten or twelve years it's pounded hundreds of nails, including the one on my left thumb

The old standard head screwdriver A true workhorse It's seen me through more twists and turns than I can remember

Socket Set my introduction to the the metric system Bought it to work on my first car Got more mileage out of it than the car

My trusty wrench Sturdy and adjustable We almost fixed the kitchen sink in '85 I did say almost didn't I?

Pliers got em before Fred moved next door in '82 lost em a couple years later found em right after he moved Coincidence? I don't think so

Ace Brand hand tools are made with a full lifetime warranty. So you'll get plenty of use out of them and a few stories too. We guarantee it.

ACE BRAND

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Zigzagger

A jigsaw's great when the cut isn't straight

BY MARK FEIRER PHOTOGRAPHS BY MICHAEL GRIMM

The short, skinny blade whips up and down 3,000 strokes a minute, and a spray of chips leads the way as a jigsaw slices precise curves.

t

m Silva's seven or eight jigsaws may gathet dust for days before they make ay "but when we need one," says the *This Old House* conttactor, "we *really* need it"

It's a tool of many names—sabet saw, bayo net saw—and many uses The short, stabbing, np and-down motion of the blade enables a jig saw to cut big sweeping curves and straight lines or nibble its way into tight corners Silva grabs one when he needs to scribe trim to brick chim neys, fit cabinets to bowed walls, cut pipe, finish cuts made by circular saws or shape metal thresholds to door jambs The tool is invaluable for plunge cutting holes for sinks, pipes and electrical outlets and making decorative scrolls and shelf brackets—jobs where cutting finesse, not speed, is important

Other tools can do similar work—sort of Reciprocating saws can cut curves bnt are too unruly for fine work Circular saws cut through wood like it's butter, but only in straight lines A handheld coping saw is precise but slow, and a band saw—though nearly as versatile as a jigsaw—isn't something to carry up a ladder No wonder *(CONTINUED ON PAGE 24)*

Fabulous Features

ILLUSTRATION BY STAN FELLOWS

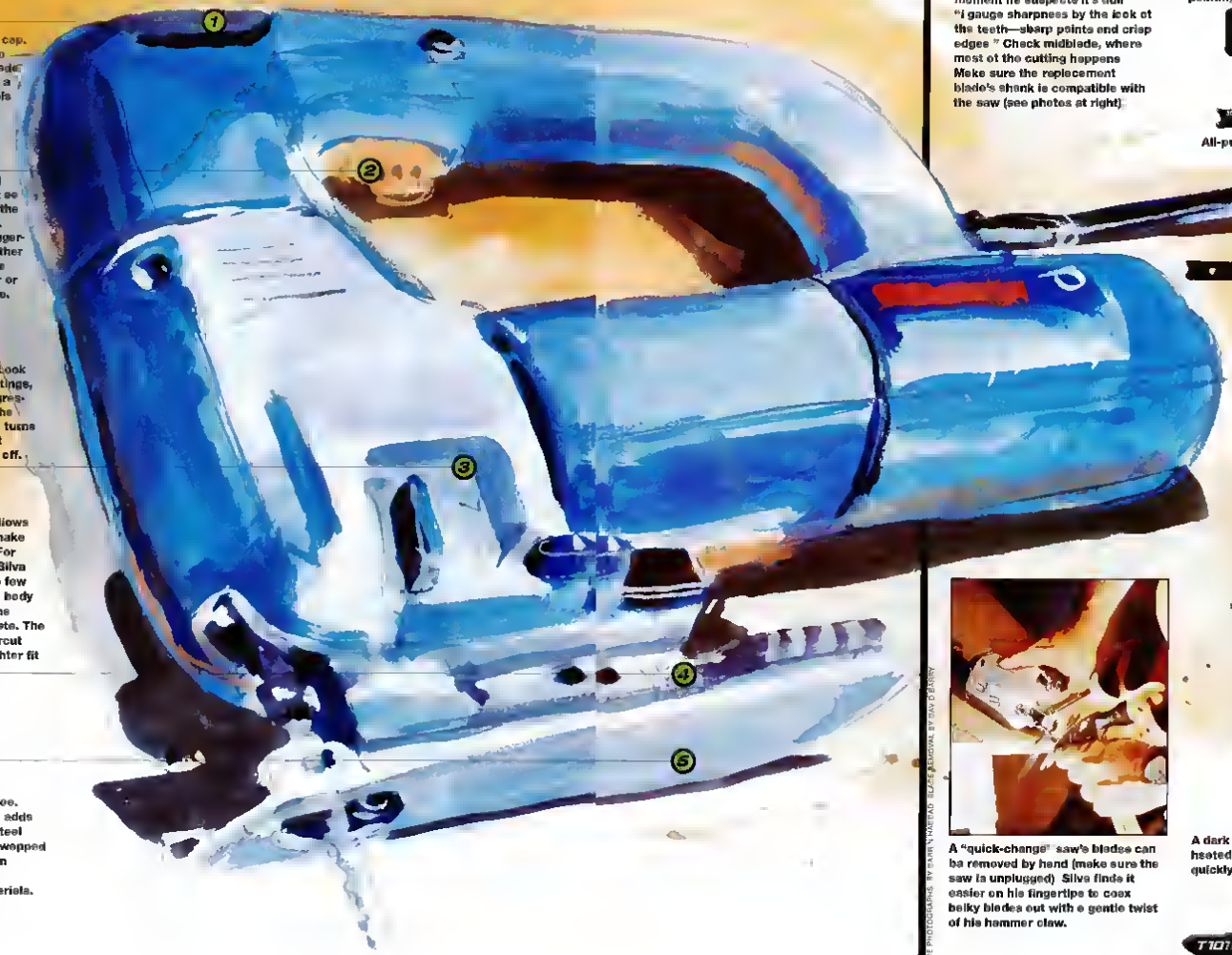
Quick-change cap. Lift and turn to release the blade. Found on only a few saw models

Variable-speed control. Adjust as needed to get the smoothest cut. This one is trigger-mounted, on other saws, it may be near the motor or atop the handle.

Orbit control. Look for several settings, from off to aggressive cutting. The smaller switch turns this saw's dust blower on and off.

Tilting base. Allows the jigsaw to make beveled cuts. For scribing cuts, Silva tilts the base a few degrees so the body of the saw leans toward the waste. The resulting undercut gives him a tighter fit

Changeable shoe. Cast aluminum adds stiffness; the steel insert can be swapped for plastic when cutting easily scratched materials.



the cutting edge

Silva discards a blade the moment he suspects it's dull "I gauge sharpness by the look of the teeth—sharp points and crisp edges." Check midblade, where most of the cutting happens. Make sure the replacement blade's shank is compatible with the saw (see photos at right).

4-inch anti-splinter wood blade features downward-pointing teeth, bayonet shank. 10 teeth per inch.

Scroll-cut blade for wood. Hook shank. Teeth point toward shank, like those on most jigsaw blades. 10 tpi

All-purpose blade for wood. Silva's workhorse. Universal shank requires screw. 9 tpi.

Medium carbide-grit blade for ceramic tile. Wide blade permits flush cuts.

3-inch blade for particleboard, plywood and similar sheet materials. 12 tpi

High-speed steel blade for medium metals and smooth cuts in wood. 14 tpi

Thin-kerf metal-cutting blade. Good for cordless jigsaws, it uses less power than thicker blades. 24 tpi.

Bimetal blade (high-speed steel and high-carbon steel) for cutting stainless steel. 24 tpi

Scroll-cut blade for smooth cuts and tight turns in wood. 20 tpi.

A "quick-change" saw's blades can be removed by hand (make sure the saw is unplugged). Silva finds it easier on his fingertips to coax bulky blades out with a gentle twist of his hammer claw.

BLADE PHOTOGRAPHS BY BARRY HAEPAD BLADE REMOVAL BY STAN D'BARRY

A dark patch means the blade has overheated and lost its temper. It will dull quickly, so toss it out before you lose yours.

(CONTINUED FROM PAGE 21) the little jigsaw is often the second power-tool purchase a homeowner makes (drills come first).

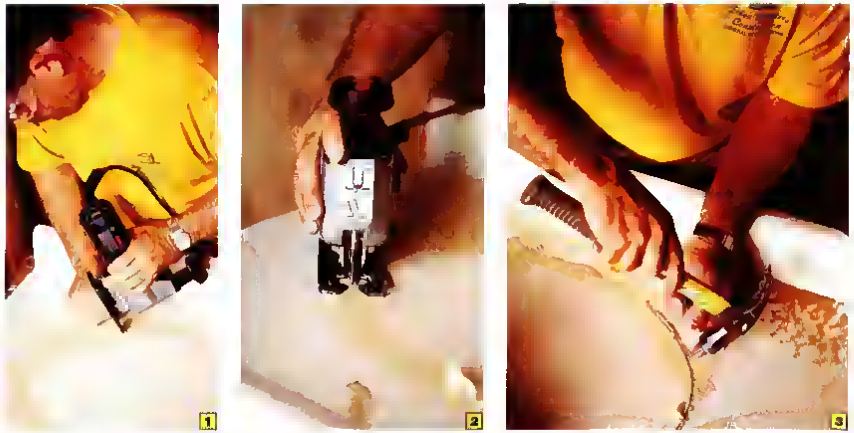
Though it may seem surprising, the biggest decision facing anyone buying a jigsaw is handle style. And on this point jigsaw owners are deeply divided. European carpenters prefer holding their saws by the barrel-shaped housing that surrounds the motor. Americans are equally fervent about the virtues of top-handled models. Yet Silva's a barrel grip guy. "A top handle saw feels nice at first, but not once I start cutting. A barrel grip saw seems more like an extension of my hand. When I move my hand, the saw just seems to follow along."

Jigsaws come in two price ranges. Simple models, fine for occasional use, go for $35 to $70. Professional-grade tools start at $130 and are more likely to include the features Silva prefers: variable-speed control, a stout, tilting shoe, a quick change blade system (no need to hunt for an Allen wrench or a screwdriver) and orbital action. Orbital action swings the blade slightly forward on the upstroke, helping the saw cut more aggressively. An orbiting blade also makes better progress rounding tight turns, it clears more of a path for itself with each stroke, so it's less likely to bind. (For a clean cut and reduced vibration when cutting metal, the orbit feature must be turned off.)

The teeth on jigsaw blades usually point up to help pull the tool toward the work on each upstroke. This also tends to spew sawdust over the cut line and splinter the surface. Most saws now have a built-in blower to keep the line clear, but when cutting something expensive like hardwood paneling, a few anti-splintering precautions should be taken. Some jig saws come with a small plastic insert that fits into the shoe and surrounds the blade, helping to hold wood fibers in place. Silva often uses a metal blade to cut wood. "The tiny teeth reduce splintering. You can also score the cut line with a razor knife," he says, "as long as you remember to cut on the waste side of the line."

Other helpful techniques: Ease the saw more slowly into a cut, turn off the orbit feature, cut with the wood's good face down or swap a dull blade for a sharp one. Even then, what works on pine might mangle maple. To get the most out of a jigsaw, the trick is to hit on just the right combination of variables: blade aggressiveness, downward and forward pressure, degree of orbit and stroke rate. Or, as Silva says simply, "Whatever works."

Taking the plunge



To cut the hole for a vanity sink, Silva draws his layout on the laminate and smooths masking tape over the lines to prevent the blade from chipping the surface. 1. After adding an extra cushion of tape beneath the leading edge of the tool's base, Silva fires up the saw and plunges its 4-inch, 14-tpi blade through the countertop. An alternative is to drill a pilot hole first. 2. Pressing down firmly to reduce chatter, he eases the saw forward, letting the blade, not his arm, do the work. 3. Silva stops several times to angle small nails into the edge of the cutout, which might otherwise rip loose as he nears the end of the cut, tearing the laminate and ruining his day.

PHOTOGRAPHS BY RAY S. BARRY

(See Directory, page 122, for details and sources)

Need a Shave?

A finely tuned hand scraper cuts cleaner than sandpaper

BY JEANNE HUBER PHOTOGRAPHS BY KELLER & KELLER

A sharp, hooked edge enables a scraper to pare the thinnest shavings from wood, as North Bennet Street School instructor

Denis Semprebon demonstrates. Scrapers are a favored tool at the Boston-based school, where Semprebon teaches preservation carpentry. His students learn to repair this country's oldest buildings.

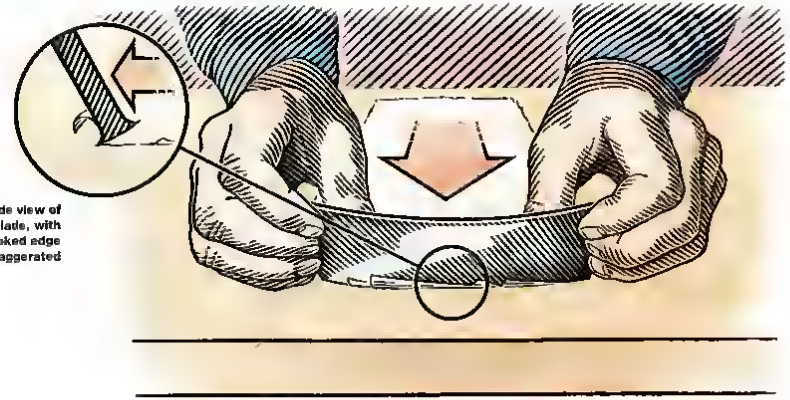
ILLUSTRATIONS BY GLENCY GIBSON

A scraper is the simplest of tools—just a thin piece of steel with a hooked edge. But that hook, pushed across wood, can shave a rough surface smooth in less time than a barber can clear a cheek of two-day-old whiskers with a straight razor.

Scraping shears wood. Sandpaper, by contrast, scours. As sanding proceeds through a series of progressively finer grits, scratches in the wood become more and more shallow until they can no longer be seen. The surface looks smooth, but it may feel fuzzy. A scraped board feels silky, and it shimmers because the wood fibers are sliced, not frayed. The surface undulates like that of a fine antique—a reminder that before the invention of sandpaper in the late 19th century, wood was smoothed with scrapers or hand planes.

Scrapers cannot be used indiscriminately. On pine and other softwoods, scraping may crush fibers or rip them from the surface, leaving pits. But scrapers work on most hardwoods, even highly figured boards such as bird's eye maple. A scraper makes such a shallow cut that there's little danger of tearing fibers, regardless of which direction they face.

Scrapers are perfect tools for removing the washboard ripples left by the whirling knives of power jointers and planers. If these mill marks lie at right angles to the grain, turning the scraper at a slight skew prevents the steel from



Side view of blade, with hooked edge exaggerated

following the humps and digging deeper troughs in the wood

Scrapers can be pulled across a surface, but most woodworkers prefer to push, with their thumbs on the back of the blade, flexing it into a gentle curve. Flexing makes the blade cut at the center, not at the corners, which might gouge

A scraper should be held nearly perpendicular to the work, tilted just slightly forward. At the correct angle, it will produce lacy shavings. If the tool must be tilted so far forward that the user's knuckles drag on the wood, the hook is too large. A large hook is also inefficient, requiring complete resharpening more often than a small one. When a small hook dulls, it can be restored about a dozen times with a few passes of a burnisher, but a large hook can be refurbished only two or three times.

Using a scraper on bare wood requires neither ear protection nor a respirator. And it even saves money. A package of sandpaper might be gone at the end of a single project. A $12 set of rectangular and curved scrapers lasts a lifetime.

About the only unpleasant aspect of using a scraper is the heat it generates, at times enough to burn thumbs. Scraper holders eliminate the problem but slow down work because the blade must be reset each time it's taken out for sharpening. To protect his skin, woodworker Denis Semprebon slips on leather thumb gloves for long jobs or swaddles his thumbs in masking tape.

Hooking an edge

Sharpening a scraper is easy but unorthodox because the aim is not to create a knife edge but to fashion nearly microscopic hooks on both sides of the blade. The process requires a mill file, a sharpening stone, a burnisher and a vise. **1. The first step is to flatten and square the scraper's edges.** Semprebon secures the scraper in a wood-faced vise and squirts oil onto a single-cut mill file to ensure a smooth cut. He holds a small wooden block under the file and flat against the scraper to keep the file exactly 90 degrees to the edge. Pressing down with both thumbs, he pushes the file along the scraper's edge a few times, repositioning it each time to protect it from uneven wear. "Consistent pressure from beginning to end—that's the trick," he says. **2.** The next step is to **smooth the sides.** Semprebon does this with a small honing stone, which he rubs in tiny circles against one side of the scraper while holding the other side steady so the metal doesn't bend. When the sides feel flat, he polishes the edge with a few passes of the stone, then gives the sides a final touch-up. "The edge has to feel square," he says, testing for burrs with a finger. **3. Fatiguing the steel** along the edge makes it more malleable.

Semprebon removes the scraper from the vise and rests it against the workbench with one hand as he holds a burnisher flat against the surface with the other. He runs the burnisher across the face of the blade four times. **4. To form the hook,** he first smears a drop of oil on the scraper's edge. Then he positions an improvised burnisher—in this case the back of a chisel—perpendicular to the scraper's edge. In one smooth motion, he presses in as he slides it along, making a burr. He does this a couple of times, then tilts the burnisher slightly and, with a final pass, curls the burr over into a hook. A tiny hook lasts longest and can be restored many times by quickly repeating steps 3 and 4. The procedure requires finesse, not brawn. "The tendency is to put on too much pressure in all the steps," Semprebon says. A properly sharpened scraper produces gossamer shavings. If it makes sawdust instead, repeat steps 3 and 4. If that doesn't work, the edge probably wasn't square to begin with. The remedy then is to go back to step 1.

MAGIC WAND

A burnisher is little more than a smooth metal rod, but to do its job the rod has to be harder than the metal it's shaping. This burnisher is made to a hardness of Rockwell 62, making it a good match for Semprebon's favorite scraper, which has a hardness of around 50. Unlike some scrapers, Semprebon's comes prequarred so the first sharpening is easier.

BURNISHER BY ROBERT HARDAS

(Continued on page 28)

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Shape and scrape

Curved sheets of steel, cut to conform to a specific pattern, can be used to scoop out chair seats, smooth wooden bowls and even remove paint from complex moldings.

Grinding a mirror image for a custom scraper

1. Semprebon first **traces** a **cutoff** piece of scrap molding onto the scraper blank—an old saw blade works fine. If no scrap is handy, use a profile gauge. Semprebon adds slash marks to his tracing so he won't forget which part he wants to remove. **2.** Sparks shoot out as the **excess metal is ground away**. Spots where the grinding wheel can't reach can be filed. For final passes on fine work, Semprebon adds a hook to the edge, but for rough work,

such as removing old paint, he uses the scraper just as it comes off the grinding wheel. **3.** For this job, Semprebon wears a **respirator** because he suspects the old paint contains lead. He figures that doing the work with a scraper and careful cleanup is safer than using a toxic stripper containing compounds such as methylene chloride, whose vapors can pass undetected through a respirator. Wetting the surface before scraping keeps down dust.

READY-MADE ESSES

A gooseneck scraper is shaped like a draftsman's French curve. Sprung between fingers and thumb, it will conform to a variety of moldings. Leonard Lee, author of *The Complete Guide to Sharpening*, recommends sharpening curved scrapers with a belt sander or a small sanding drum.

GOOSENECK SCRAPER, BY BARRY H. HASTAR

(Continued on page 30)

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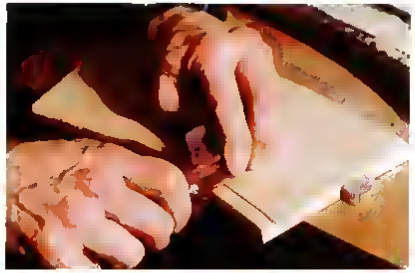
Tool of a thousand uses

Think of a scraper as a device for removing bits of anything, and there's no limit to the jobs it can do. A scraper can slice off brushstrokes before a final coat of paint is applied, bead a board in less time than it takes to set up a router and pare off gummy masking-tape residue. And if Julia Child ever reads this...

Decorative edges

It's possible to add a bead to a curved edge with a router, but an even crisper detail can be cut with a scraper fashioned from a band-saw blade and fitted into a homemade handle. Sempreboni made his own handle from a scrap of rosewood. It has a slot for the blade, a screw to hold the metal snug and a notch to keep the blade a uniform distance from the edge of the workpiece. He first makes a few shallow passes, then loosens the screw and lowers the blade as the cut deepens. A rounded edge does wonders to dress up shelves on a simple bookcase. To patch broken or missing furniture details, Sempreboni glues on a slightly oversize piece of wood, then shapes it with a custom scraper. This is far simpler than trying to shape a freestanding patch and then glue it in place.



Chocolate curlicues

With the sights and smells of an Italian immigrant community surrounding the North Bennet Street School, it doesn't take long to wonder what a scraper could do to a brick of imported bittersweet chocolate, a nice hard wedge of parmesan, a block of ice or a stick of peppermint.

(See Directory, page 123, for details and sources)

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Crowning Touch

Where ceiling meets wall, it pays to sweat the small stuff

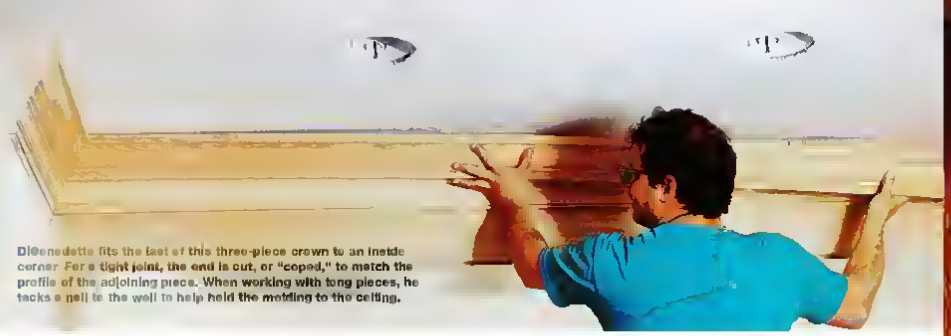
BY CHARLES WARDELL PHOTOGRAPH BY MICHAEL GRIMM

Despite their apparent complexity, all crown moldings can be made from about 20 basic shapes or profiles piled one atop another. The profiles for this molding include an ogee and various coves and beads. Rather than mill the profiles into one wide (and expensive) piece of wood, the carpenter incorporated a standard piece of pine crown, top, and two custom-milled moldings of poplar.

Ever since Renaissance architects borrowed the idea from Greek and Roman temples, crown molding has been an elegant way to cover the hard-edged joint between wall and ceiling. Its graceful, ogeed fillip—a ripple on the boundary of horizontal and vertical—frames a ceiling, elevating it to a higher plane.

The twists and turns of a seamless crown are admirable but tough to put together. Although the molding in situ presents the illusion of being solid, it is usually made of thin strips of wood, which bend and sag when they are being installed. Unless carefully measured and cut, there are likely to be ugly gaps, ill-fitting joints, misaligned profiles and a large pile of scrap.

Carpenters who install crown molding are more like cabinetmakers than framers. When a trim carpenter messes up, his mistakes are on permanent display. A framer's errors get buried under drywall.



DiBenedetto fits the last of this three-piece crown to an inside corner. For a tight joint, the end is cut, or "coped," to match the profile of the adjoining piece. When working with long pieces, he tacks a nail to the wall to help hold the molding to the ceiling.

Bernie diBenedetto knows he cannot afford to make mistakes. After eight years of installing trim and building cabinets, he works with a single-minded concentration that defies interruption, patiently shaving here and there until only a razor-thin line shows where two pieces meet. Stained moldings demand such fussiness. Gaps can't be covered with caulk and paint. But even if the wood will be painted, diBenedetto works to a stain-grade standard. As *This Old House* painting contractor John Dee says, "You don't need much caulk on Bernie's work."

Tight joints are the measure of quality workmanship, but materials count too. DiBenedetto handpicks his stock to weed out burn marks, sap pockets and any other defects. He also makes sure all profiles are identical. If two pieces don't match exactly, almost nothing can be done to make a joint fit.

To install crown molding, a trim carpenter has to know how to cut three types of joints: scarf, miter and cope. A scarf is an overlapping joint between two pieces in a straight run of molding. If diBenedetto had his choice, a molding would always be long enough to reach from corner to corner without a scarf. When it's not, he cuts pieces at a 22½-degree angle, then glues and nails them. For large moldings, which can be quite hard to align, he makes a straight cut and joins sections with biscuits.

Miter joints are used wherever two pieces of molding meet at an outside corner, like the corners on the outside of a box. Miters are tough because cuts must line up exactly, and even the most perfect cuts are thrown off if the walls and ceiling aren't square. Good trim carpenters leave pieces a bit long and shave them down with a miter saw or block plane until they fit. A "one cut carpenter" is diBenedetto's code name for someone who does sloppy work.

On inside corners (like those on the inside of a box), diBenedetto uses the more forgiving cope joint. A cope is a cut in the end of one molding that follows the contour of the profile. The coped piece will overlap its neighbor.

When installing molding in a room with only inside corners, diBenedetto's strategy is to install the first piece on the wall opposite the main doorway, each end cut square and butted into the corners. He copes one end of each of the side wall pieces and makes straight, 90 degree cuts on the ends that butt the opposite corners. All measurements are taken corner to corner, in line with the bottom edge of the molding. The last piece over the doorway is coped on both ends.

DiBenedetto demonstrated his double-coping technique over an 8-foot-wide entry. After measuring, he added ⅛ inch, then cut and coped the ends. Up on the stepladder, he bent the copes toward the corners, sucking in his breath as he quickly mated them to the side-wall moldings already in place. A slight push, an exhale, and the coped crown flattened against the wall. He looked over his shoulder and smiled. "Did those joints tighten up or what?"

First, make a sketch

Half the trick to using crown molding efficiently is making accurate cuts. The other half is buying no more than needed. To calculate how much to buy, sketch out the room's perimeter, then mark the length of each wall, indent and projection to which molding will be added. Arrange the pieces on paper so as to have as few joints as possible. Most moldings come in 16-foot lengths, so a 10-foot wall in one part of the room and a 4-foot-deep alcove in another can be cut from the same piece. At every joint, add 2 inches to each piece of molding to allow for cutting. Divide the total number of feet by 16 (or the longest length the molding comes in), then round up to the nearest whole number. If two pieces of molding have to be joined in the middle of a run—when a wall is more than 16 feet long, for example—try to place the joint in an inconspicuous spot, such as over a door, not directly opposite the entry where it will be the first thing people see.

STOP GAPS

Crown molding can't beautify a room if it draws attention to the gaps in an uneven ceiling. If the gaps are small, try pushing the top of the molding up and back toward the wall. If that doesn't work, fill the gaps with caulk. Small bumps can be accommodated by shaving off the molding's top edge with a block plane. (Don't try this near outside corners.) There's a limit to how much a molding can be bent without throwing off the joints or planed without anyone noticing. When facing a ceiling with large bumps and hollows (and a budget that doesn't allow for a plasterer to level it), try leaving a slight gap between the molding and the ceiling—a quarter of an inch will do nicely. Secure the crown with triangular nailing blocks.

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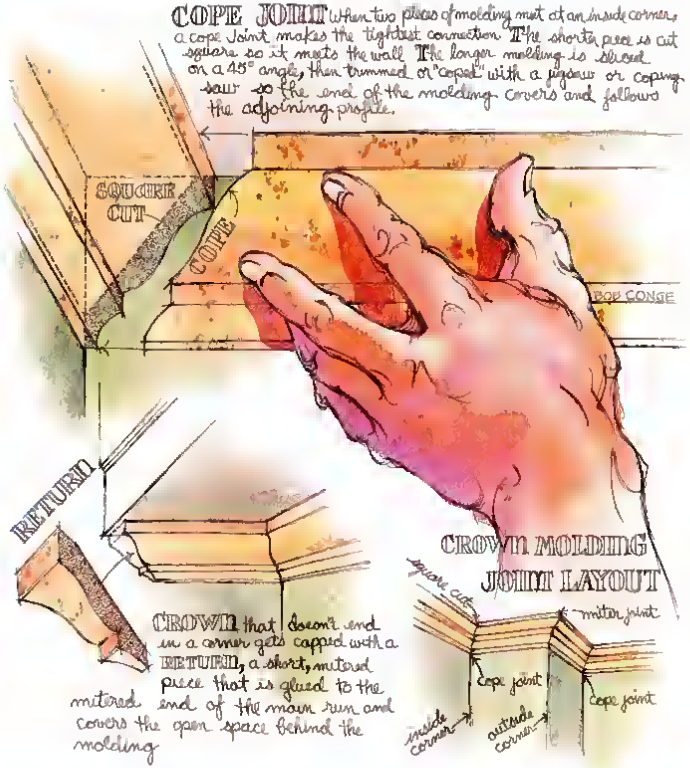
TOH996

Coping with a tricky cut

ILLUSTRATION BY BOB CONGE


COPE JOINT When two pieces of molding meet at an inside corner, a cope joint makes the tightest connection. The shorter piece is cut square so it meets the wall. The longer molding is sliced on a 45° angle, then trimmed or "coped" with a jigsaw or coping saw so the end of the molding covers and follows the adjoining profile.
SQUARE CUT
COPE
BOB CONGE
RETURN
CROWN MOLDING JOINT LAYOUT
square cut
miter joint
cope joint
cope joint
inside corner
outside corner
CROWN that doesn't end in a corner gets capped with a RETURN, a short, mitered piece that is glued to the mitered end of the main run and covers the open space behind the molding.

1. The first step in coping a crown molding is to reveal its profile by cutting a 45-degree inside miter. Crown molding is always cut face up and upside down, with its top edge on the saw's base and bottom against the fence. For safety and best results, lower the blade slowly through the work and let it come to a stop when the cut is complete. A spinning blade can tear splinters from the cut or snag the wood—not to mention a finger.
2. After the inside miter is cut, it's time to cut the cope. DiBenedetto highlights the edge of the profile with a pencil, then follows the pencil line as he saws off the miter's exposed end grain. What's left is a mirror image of the profile. Angling the saw so it undercuts the profile helps ensure a tight fit. DiBenedetto cuts most copes with an electric jigsaw and a 14-teeth-per-inch blade, but the tool has to be used with great care or the wood will splinter. Here he's using a coping saw, the method Norm Abram prefers.
3. After making the cope, test it. If the molding doesn't fit, take more off the back side with a rasp, shown here, or utility knife.

HELLER & HELLER

(Continued on page 41)

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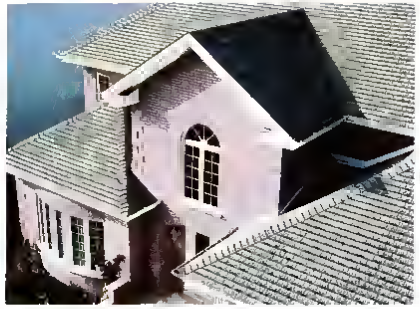

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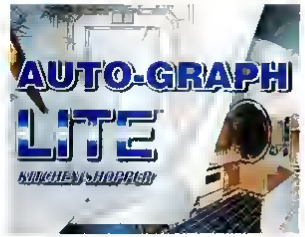

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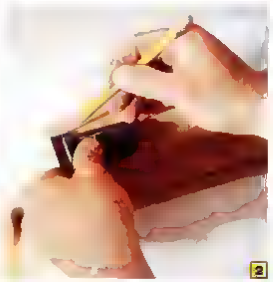
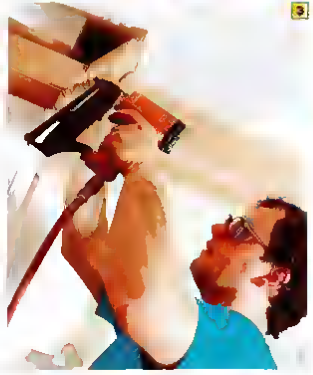
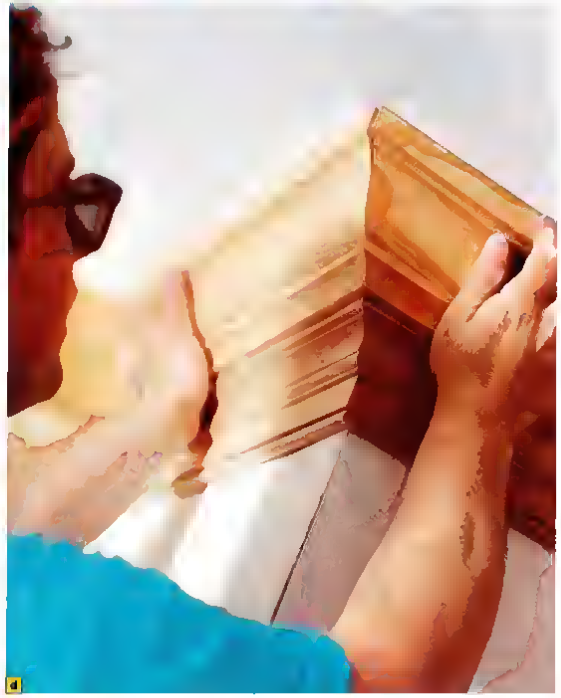
Perfecting an outside miter



1. One secret of a tight miter joint is keeping the pieces in precise alignment. To do this, diBenedetto pnts marks on the wall and ceiling to help guide crown placement betore he hammers.
2. After preparing the base meldings, he uees a square to mark where the crown's bottom edge will rest. Then, with a scrap of molding held to this mark, he makes matching marks on the ceiling



3. An air-powered brad nailer speede a trim carpenter's work. There's no ponnding to jostle joints, it's one-handed, and the fastener sets automatically belew the snrface with just a pull of the trigger. The brede only tack the melding in place. Finish nails will be hammered into the framing later; these should be long enough to penetrate as ter as the molding is thick.
4. It e difficult to get miter joints tight and keep them thet way. DiBenedette finds out-of-square corners—the bane of trim carpanters—by holding a mocked-up sample against all outside corners. If the sample doesn't fit, he knows he'll need to spend more time trimming the real thing. This test fit of mitered melding shows a slight gap near the top. Wood glne brushed on the miter cuts and a 4d nail shot through the top of both pieces will close up the gap. Once everything's tight, diBenedetto cleans up the edge with 120-grit sandpaper.



KELLER & KELLER

(See Directory, page 123, for details and sources)

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Gap Goop

Sorting out silly putties from serious caulks

BY BRAD LEMLEY PHOTOGRAPHS BY DARRIN HADDAD

Caulk performs one basic task. It fills gaps. Our needs for it are almost as simple: to seal things, such as water, air, insects or fire, in or out, or to beautify, such as when we cover the inevitable fissure between straight trim and wavy walls.

Until the 1950s, the composition of most caulk was as straightforward as its purpose. Often called putty, it was usually made of ground limestone (calcium carbonate) and a drying oil such as soybean, tung or linseed. But putty hardened, and it cracked when joint walls moved. This limitation inspired the development of today's array of elastomeric caulks, which stretch and compress—sometimes even as much as their manufacturers claim. While the terms caulk and sealant are often used interchangeably, caulk generally refers to compounds with low elasticity. Sealants stretch and compress better, cost more and last longer.

Americans aren't stingy with caulk. Last year, we bought the equivalent of some 233 million 10.3-ounce tubes. If one tube can lay down a ¾-inch-wide bead about 55 feet long, that's enough caulk to squeeze a bead down the centerline of every paved road in the United States—all 2.4 million miles of them.

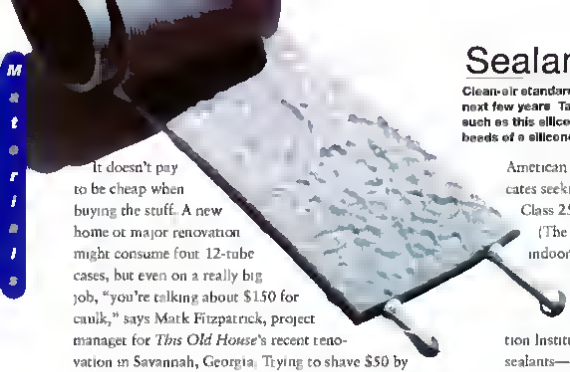
Binder basics

Caulks and sealants consist of binders, fillers, liquids and additives. Binders, such as silicone and latex, have the greatest effect on flexibility, durability and adhesion, so caulks are classed by binder type. Fillers control consistency. Additives run the gamut from colorants to mildewcides. Liquids—water or solvents—hold the ingredients together in suspension.

Goo for every gap

Caulk chemists constantly fiddle with formulas so sealants will perform particular tasks or survive demanding conditions. The dozen below exhibit a few of their accomplishments.

Mortar patch: Colored to match most mortars between bricks or blocks.
Asphalt: Colored to match blacktop, also works on roofs.
Removable: Sticks better to itself than to its substrate. Use it to seal gaps around windows in the winter; peel it off in spring.
Fibrous insulation: Used to stick insulation onto metal ductwork.
Metal Duct: Stops air leaks from metal duct joints and flexible plastic ducts.
Firestop: Able to withstand temperatures up to 2,500° F for six hours. Typically applied where pipes penetrate walls and ceilings.
Marine: Fills the joints between wood planks on boat decks; able to survive sun, salt and repeated immersion.
Gutter and Foundation: Seals gaps in aluminum gutters and storm windows. Will also stick to wood and masonry.
Roof: Asphalt-based caulk for plugging leaks around chimneys and holes in shingles. A stopgap measure, not a long-term solution.
Glazing: Fixes window panes; replacing hand-warmed putty and putty knives. Square nozzle leaves a flat-topped bead.
Colored: Blends in with colored countertops, tubs or sinks. Remains glossy.
Tub and Tile: Loaded with enough mildewcide to be labeled "mildew proof"—at least for a year.



Sealant of the future

Clean-air standards will eliminate most solvent-based sealants over the next few years. Taking their place: more "100-percent solid" sealants, such as this silicone ribbon used in commercial applications. Twin beads of a silicone-based adhesive anchor it to its substrate.

It doesn't pay to be cheap when buying the stuff. A new home or major renovation might consume four 12-tube cases, but even on a really big job, "you're talking about $150 for caulk," says Mark Fitzpatrick, project manager for *This Old House*'s recent renovation in Savannah, Georgia. Trying to shave $50 by switching to a low-end sealant will cost more in the long run.

Contractors typically choose sealants based on extensive personal experimentation. Fitzpatrick favors polyurethane for exterior applications because it's durable, easily painted and adheres tenaciously. *This Old House* painting contractor John Dee waxes eloquent on the crack-hiding qualities of siliconized acrylic latex for interior trim. Peer into Tom Silva's caulk gun and you'll likely find the same thing.

The first step when selecting a sealant is matching it to the task. Until about 10 years ago, silicone and latex were the high-quality choices. But manufacturers have since cooked up hundreds of recipes for specific tasks, from patching aluminum gutters to filling cracks in asphalt or repairing glass aquariums.

Sometimes the same ingredients show up with labels specifying different uses. That's just plain old target marketing. (A tip: Silicones marked "for marine use" are often no different from everyday household silicones but cost twice as much.) Or the same sealant can be tested to different specifications. Or the variations in two formulas are so slight that the ingredients listed on the labels appear to be the same.

For a long time, the only way to know in advance if a sealant had the right stuff was to look for a TT series federal specification number (such as TT-S-00 230C). Many tubes still list them, but Jerome Klosowski, chief scientist of Dow Corning's sealants division and chief delegate to the International Standards Organization's sealant section, says federal specs are so outdated that even the government ignores them and relies on standards set by the American Society for Testing and Materials. Klosowski advocates seeking out sealants with the up-to-date ASTM C 920 Class 25 designation, the toughest standard for sealants. (The less rigorous ASTM C-834 is for caulks used in dry, indoor locations.)

But because manufacturers are responsible for testing their own products, label claims should be regarded skeptically. The Sealant, Waterproofing and Restoration Institute recently began endorsing independently tested sealants—those that pass are stamped "SWRI"—but the program is in its infancy. "We need to educate the public to demand SWRI validation of performance," Klosowski says. "Without that, there's really no policeman."

Even the best caulk will fail if not applied correctly. Surfaces must be dry and scrupulously clean—free of dirt, oils and flaking paint. Give joints a thorough scrubbing with solvents such as rubbing alcohol. Old caulk can sometimes be loosened with a heat gun. Before caulking, Dee always brushes primer on raw wood to promote adhesion.

After application, a bead of sealant should be tooled into the joint. This fills voids, promotes adhesion and produces a clean look. A moistened finger works (don't put it back in your mouth), but a plastic spoon or wooden tongue depressor gives more consistent results. Sealants that skin over quickly, such as silicone, need immediate attention. Don't use so-called tooling lubricants—they can weaken adhesion.

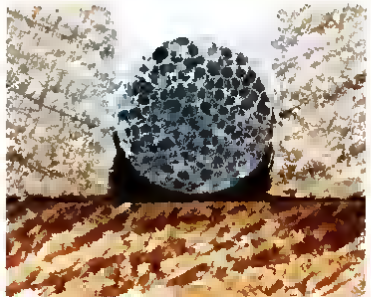
Proper application matters because virtually all warranties cover only the sealant. If a leak causes $10,000 in damage, you'll get back the $3 you paid for the tube—if you keep the empty tube and the receipt.

If all the choices seem a bit dizzying, keep in mind what Norm Abram says. No matter how chemically advanced they become, sealants will never take the place of good design and careful carpentry. "We see a lot of places where someone has used sealant to make up for poor workmanship," he says. "No sealant is foolproof. You want a design that sheds water naturally. Good workmanship will last a lot longer than any sealant."

(See Directory, page 123, for details and sources)

Fill it with foam

A sealant applied too deeply into a joint will stretch poorly and is likely to fail. To keep sealant depth no more than half its width, press a backer rod made of polyethylene or polyurethane foam (below) into the joint before applying the sealant. Even shallow joints will fail if sealant adheres to both joint walls and substrate. A flat bond-breaker tape applied to the bottom of such joints solves the problem.



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Wired

The right extension will carry the load
But plug in the wrong cord, and you may be in for a nasty shock

BY KEN TEXTOR PHOTOGRAPHS BY JIM COOPER

Coiled and ready to strike, this extension cord has at least two desirable attributes: a three-pronged plug and a durable jacket made of old-fashioned natural rubber.

An extension cord's job is so easy—to convey electricity from here to there—that we hardly give the cord itself a second thought. But as *This Old House* electrician Paul Kennedy learned the hard way, any old tangle of wire won't do. Eighteen years ago, the eager apprentice rigged a job-site extension cord from a 250-foot roll of standard household wire—leaving 150 feet on the reel. Not much later, he recalls, "I knew something was wrong when I looked over and saw smoke."

Kennedy remembers being pretty pleased with his ingenuity: a plug on either end of the wire, and it was ready to go. But within minutes, the wire got so hot its coating melted. His creation was on the verge of shorting out when he raced over and pulled the plug.

The physics of what went wrong are simple. Kennedy tried to pull too much power through too long a wire, turning it into something like the heating element on an electric stove. The 150-foot coil compounded his error by blocking the escape of heat. "I never did anything like that again," he says.

In the nearly two decades since that meltdown, the lowly extension cord has evolved into an advanced piece of equipment, with outer jackets that remain flexible in the coldest weather, plugs that light up when electric-

ity is running through them, built-in circuit breakers and plugs that lock together so well that a dangling cord and a powerless tool at the top of a ladder are things of the past.

Nifty features aside, the most important part of picking the right extension cord is making sure it can safely deliver the power the tool at the other end needs. Whether a cord is right for the job depends on three things: how thick the wire is, how long it is and how many amperes of electricity will be drawn through it.

Gauge—the thickness of the wire inside a cord—determines how many amps a cord can handle. The thicker the wire, the lower the gauge and the more current it can carry. Ordinary household cords are typically 18- or 22-gauge wire—not at all suitable for workshops or job sites. Those environments require middleweight 14- and 16-gauge cords, which are fine for medium loads that don't have to travel very far. Outside, over distances of 50 feet or more, fat 10- and 12-gauge cords are the only way to go.

Length is a critical factor because even a good conductor like copper nibbles away at voltage. The longer the cord, the greater the voltage drop. A drop of 5 percent or more slows down a tool's motor, making it work harder, run hotter and die sooner. Kennedy's rules of thumb are: No cords longer than 150 feet—ever—and, if different cords are plugged together, plug the heaviest gauge cord into the outlet.

When choosing an all-purpose cord, it's best to favor thicker wires and shorter lengths. The heat generated in undersized wire can permanently reduce copper's conductivity. For household and yard work, the total load on one cord shouldn't exceed 15 amps (the rating of a typical household circuit breaker). Any extension cord should bear UL (Underwriters' Laboratories) and OSHA (Occupational Safety and Health Administration) labeling on the package. And although many shop cords have two wires running through them—especially in the lighter gauges—those with a third grounding wire (as evidenced by a three pronged plug) offer more protection in the event of a tool short-circuit.

Like most electricians, Kennedy has experienced the full force of 120 volts. He shakes his head at the memory. "Don't go there," he says.

WIRE WRAP

The easier a cord coils up and snakes around a work area, the more likelie it will be. Flexibility begins with the wire itself: the more strands per wire, the better. Seven strands are standard. Paper and plastic fillers allow wires to move inside the jacket and help maintain a round cross-section. Most cords have PVC plastic jackets, which get stiff in the cold. Rubber jackets don't; their flexibility is tops.

Cord decisions

To choose the right wire size, first determine the amp load it's going to carry. If more than one tool will run on the same cord at the same time, add all the amps together to get the total load. Next, decide on cord length. The chart below shows the maximum amp load at a 3 percent voltage drop for three common cord lengths. If maximum amperage is between two wire gauges, use the thicker one.

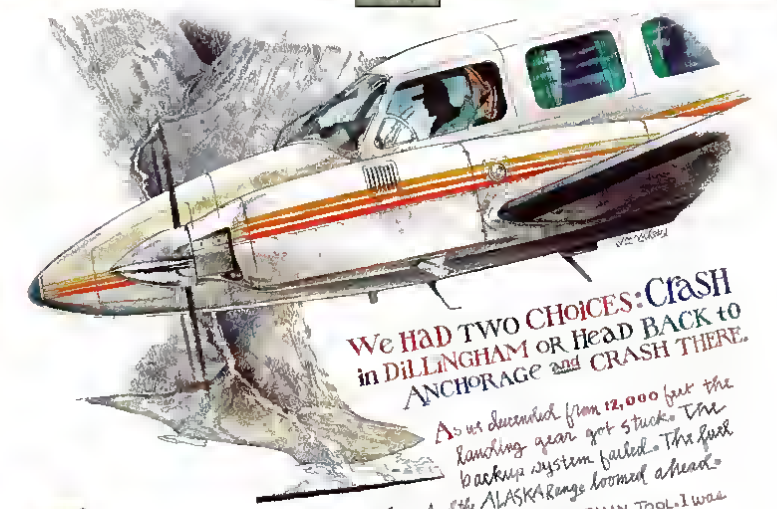
10 GAUGE | 14 GAUGE | 12 GAUGE | 16 GAUGE

25 feet of cord	50 feet of cord	100 feet of cord
15 AMPS	15 AMPS	14 AMPS
15 AMPS	15 AMPS	9 AMPS
15 AMPS	11 AMPS	5 AMPS
14 AMPS	7 AMPS	3 AMPS

TOOL TALES

[REAL STORIES OF LEATHERMAN® TOOLS AND THE PEOPLE WHO USE THEM]

№ 6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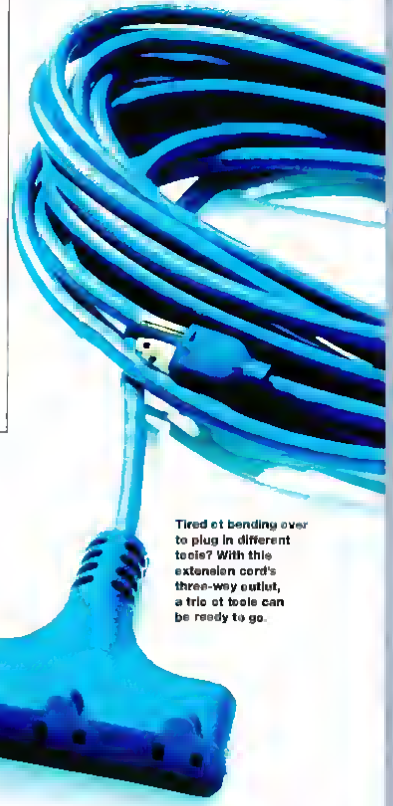
When this cord is plugged in, the female end lights, confirming that power is running through it

A short circuit in a tool or cord can kill. Cords with a built-in ground-fault circuit interrupter (GFCI) eliminate the risk. Standard in bathroom outlets for several years, ground-fault interrupters have only recently been wired into extension cords. When the device senses a minute power surge—as little as 0.005 amp—it cuts off the power in ¼₀ of a second. An ordinary extension cord will administer a 120-volt jolt until the house circuit breaker shuts down. The interrupter should be plugged into a house outlet, never into another extension cord.

Cool Cords

The humble extension cords of old—with heavy coils that tied themselves into knots when nobody was watching—have metamorphosed into modern, sophisticated pieces of equipment with special features that improve their safety and convenience



Tired of bending over to plug in different tools? With this extension cord's three-way outlet, a trio of tools can be ready to go.

In-line circuit breakers cut off electricity when the load exceeds a preset amperage. Once the overload is remedied, power can be restored with the push of a button. Unlike GFCIs, these are designed to protect wiring, not humans.

(See Directory, page 123, for details and sources)

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Buyer's Agents

In the real-estate jungle, you may need a different kind of guide

BY WENDY TALARICO

Stories about being misrepresented, ignored, insulted, lied to or outright cheated by real-estate agents are lamentably easy to find. Consider what happened to Lucinda and Jim Greene of Littleton, Colorado. The Greenes have had their share of bad experiences—agents leaking information to the seller or keeping important details from them. But the real doozy came a few years ago when, after they went to contract on a house, the inspection turned up a dangerously high radon level. The Greenes wanted out, but their agent did nothing to help them. It took a stern letter from Lucinda to the seller and the seller's agent to get the contract canceled and their deposit returned. The experience left them emotional wrecks. "We suffered so much through that deal. It was just horrible in every way," she says.

ILLUSTRATION BY FRANCISCO CACERES

Some of the angst that accompanies a typical home purchase is understandable. Money flows in huge chunks, and the paperwork can seem endless. But the more fundamental problem is that buyers are seldom clear about whose side "their" agent is really on.

Buyers go into a deal thinking the agent who drove them around to look at dozens of houses, who took down all that sacrosanct personal and financial information, is negotiating on their behalf. Not true. Traditional real-estate agents generally work for the seller.

Realizing your agent isn't on your side is a little like learning there is no Santa Claus, but it's been that way since the beginning of real estate brokerage. For buyers, the worst form of this arrangement is when one company handles the whole shebang, listing and showing the house, bringing in the buyer, closing the deal and getting the entire commission. Dual agency is the industry term for this, and 13 states think so little of the setup that they've outlawed it. More often, one brokerage firm contracts with the seller to list and market the house, and another brings in a buyer. When the deal is done, they split the commission, paid for by the seller.

In these scenarios, buyers are without allies. But there's a new broker in town who is committed—often by contract—to work only for the buyer. He's called a buyer's agent, and it's his job to report on the condition of the house, the neighborhood and the schools, negotiate terms with the seller, dicker with lenders and dispense advice on tricky

details. Although the number of buyer's agents is still very small—from 700 to 3,000, depending on who you ask—their ranks are swelling fast, in part because of stronger real-estate disclosure laws. Many states require agents to tell buyers early in the process who they actually represent.

Consumer groups have also spread the word. A 1994 study of the real estate industry by the Consumer Federation of America (CFA) strongly favored buyer's agents. "Now, buyers have true representation, and that helps to restrain rising house prices," says Stephen Brobeck, CFA's executive director. For buyers, it's clearly a better way.

The Greenes would agree. Thanks to a buyer's agent, their most recent house purchase was, Lucinda says, "smooth and easy." The agent "warned us about things that weren't favorable about the house that he thought we should be aware of."

When buying his seventh house in 25 years, Gary Palka of Aurora, Colorado, had an equally positive experience that tempered an otherwise low opinion of agents. "They just don't listen," he says. "You tell them you want a Cape Cod in a midpriced neighborhood, and they take you to a Colonial in a upscale area—usually one of their listings. They waste your time and leave you frustrated. By comparison, working with a buyer's agent was wonderful."

Palka's agent, Russ Murray of Buyer's Resource Southeast in Denver, is accustomed to accolades. "We don't walk around complaining about buyers and their indecision. We work with them. They're our bread and butter."

But as obvious a choice as a buyer's agent may seem, house hunters still need to ask hard questions about what kind of buyer's agent they're riding with. Some, like Murray, represent buyers only and are called exclusive agents. They have no property listings. Others, called nonexclusive agents, represent both buyers and sellers at different times but may call themselves buyer's agents. Exclusive agents, says CFA's Brobeck, are hardest to find. "What you have today are mostly nonexclusive agents working in large agencies. So whenever they show one of their company's listings, they must disclose that to their client."

Along with giving buyers a stronger hand in the real estate game, buyer agency has also created new ways of paying commissions. Tradition still reigns. Most buyer's agents are paid from the seller's proceeds—half of a typical 6 percent commission. But buyers can also control that process. George Rosenberg, a longtime buyer's agent who also maintains the Buyer's Broker Registry, a national referral service, offers an example. "On a $100,000 house, the buyers may offer $97,000 to the sellers and commit to paying their agent $3,000. The sellers just have to pay the listing agent the other three percent." The net proceeds to the seller: $94,000. That's the same as in the standard deal, but this arrangement cements the agent's allegiance to the buyer. It also keeps the seller from paying someone who has fought them on price and terms, something Rosenberg sees as ethically problematic.

In the case of very expensive houses, where agents may earn huge sums for little effort, a buyer's agent may agree to work for a flat or hourly fee. "I once received an $8,000 fee for a $1 million house," Rosenberg says, "and thought it was fine for the work I put in." To secure the buyer's commitment, some buyer's agents charge an initial retainer fee—as much as $500—which may be refunded if a deal is done.

Whatever the financial arrangement, buyer's agents and buyers often sign an exclusivity agreement committing themselves to work together for as long as a year. It often stipulates that the agent make a commission or earn a fee on any house the buyer purchases with any agent within the contract period, which keeps the buyer from trying to duck the payment. Buyers, on the other hand, are given strong grounds on which to sue the agent if they feel wronged.

Protections notwithstanding, it's still up to the buyer to choose well when selecting an ally. Buyer agency alone does not a great agent make. "A good agent is good no matter who he's working for," says Kim Nelson, a nonexclusive agent based in Fredericksburg, Virginia. "Buyer's agents are no more ethical or thorough or concerned about customers. They still want to make their deal like anybody else. But chances are better they'll look after the buyer's interests. That's more than most buyers had in the past."

Realizing your agent isn't on your side is a little like learning there is no Santa Claus.

Looking for a few good agents?

Buyer's agents make up a small fraction of all real-estate agents, but they are located all over the country. To find one, look for "Real Estate—Buyer Broker" or a similar listing in the Yellow Pages. Referrals are available from the National Association of Exclusive Buyer's Agents (800-986-2322), the Buyer's Broker Registry (805-492-8120) and the National Association of Real Estate Buyer's Brokers (415-591-5446). Don't forget to thoroughly interview candidates to find out how they operate and how they expect to be paid.

(See Directory, page 123, for details and sources)

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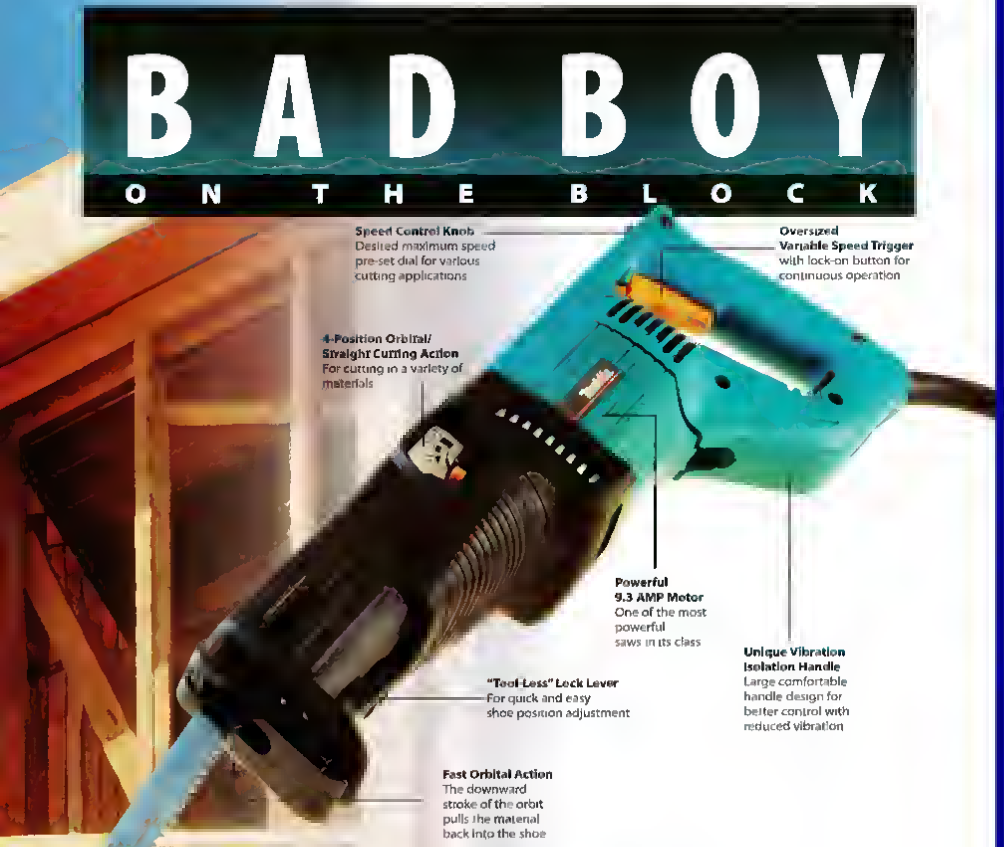
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A Letter From This Old House

At the head of the widest part of Main Street, a few blocks west of the wharf in old **Nantucket Town,** looms a formidable three-story red-brick bank. The tall windows of Pacific Bank seem to give the building eyes, and it gazes seaward, down the block of boutiques, to the front doors of the Pacific Club.

Although a bank named for an ocean more than 3,000 miles away from this eastern island may jar logic, there's a good reason for it. Nantucket's original wealth was built on whaling. From 1800 to 1840, Nantucket captains pursued the world's largest mammals relentlessly, usually to the farthest reaches of the planet's greatest ocean. Home from successful voyages, they traversed the shorter latitudes of Main Street, up to the Pacific Bank to deposit their money, down to the Pacific Club to play cribbage and swap sea stories.

In those boom times, captains and merchants alike had the money to build magnificent houses. But by the late 19th century, oil by products from Pennsylvania wells had replaced whale oil for illumination and lubrication, and women no longer wore corsets framed with whalebone. Nantucket sank into an economic decline from which it has only recently emerged. Unlike many other towns that withered in such circumstances, though, old Nantucket was not bulldozed in the name of urban renewal.

Today Nantucket is back on top. In the full flood of summer, the airport is the second busiest in New England, and the cool voices on the control tower's frequency of 126.6 megahertz are often those of corporate-jet pilots. In town, trendy Range Rovers choke Main Street. Money from elite East Coast vacationers has rebuilt the island. Antique houses in the old Quaker village are meticulously cared for, their gardens perfectly kept. Real-estate prices are unfathomable. Many modest homes sell for well over a million dollars.

But wealth alone has not kept Nantucket pristine. Houses here are restored, not simply kept up or remodeled—an approach rare in this country. Our old Nantucket house, the Victorian at 3 Milk Street, was built in 1887 of cheap, mostly secondhand materials. Its single bathroom, decrepit kitchen and antiquated electrical, plumbing and heating systems all need to be replaced. New owners Craig and Kathy Bentley and their two children plan to use the house on weekends and holidays during the next few years. Then the Bentleys hope to retire here. "We want to improve our house with respect for Nantucket's traditions, because we plan to be here a good long time," Kathy says. On Nantucket, people care about the past as a means of insuring their future.

As we embark on the 18th season of *This Old House*, we wish the Bentleys well. I, for one, will be paying close attention to this project, for I too can think of no more charming place to retire.

Steve Thomas

LIFE IS FULL OF HURDLES.

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chuck crispin

Only a philosopher in search of perfection

Chuck Crispin is on his knees on the cold concrete, resting back on his haunches, something he tries to remember never to do anymore. At age 45, a hardwood-floor man must treat his knees gently. He's in the Oakwood Inn's library, a small room in the shape of half an octagon. Well, not exactly half an octagon, which is his dilemma. One wall runs five inches longer than the facing wall. One wall has 24-inch bookshelves extending from it, while its opposite has no shelves. That difference has made the room's

BY WALT HARRINGTON

PHOTOGRAPHS BY THIBAULT JEANSON

would worry so much about the of an inch

The hired to lay this salvaged plen- se hun There ough to d floor, ternated with pi aru.

fireplace look off center. And because the Syracuse, Indiana, lakeside resort hotel is a commercial building, the library's doors swing out for safety, meaning the six inches of red oak floor Crispin wants outside his elaborate, laser-carved oak leaf border will have to be widened along that wall. Otherwise, people inside the library will see carpet poking under the closed doors.

"I am not going to let that happen," Crispin says.

It's after dark, and the spindly lamps he has set around the room cast ghostly shadows. The other workmen were gone and the front doors locked by the time Crispin arrived. At night he doesn't have to hear the booming country music endemic to construction sites these days. He prefers the jazz of Chet Baker or even recorded readings of Shakespeare's sonnets. An hour after he arrives, his brown hair is flecked with oak splats that spew like sparkler beams from his miter saw as he cuts lengths of flooring. In jeans, penny loafers and a ratty green sweater, his glasses pushed up on his head, Crispin looks more like the disheveled philosophy professor he might have become after graduating from Northwestern University than he does one of America's finest inlaid-floor craftsmen.

Crispin's Eternal Spring, above, includes 16 exotic woods, as well as white Greek marble and blue Brazilian agate. His Kekepelii dancers, below, are designed to appear as if they are apparitions rising from the fire's smoke.

"Boy, that is a shame," he finally says, rising from the floor, running splayed fingers through his hair and launching a storm of burnished oak flakes around his head. "I have an asymmetry here that's never going to be perfect. The Greeks spent a lot of time thinking about the correspondence between the ideal and the real. Everything that exists is imperfect. You create the illusion of perfection."

In Crispin's case, that illusion is convincing. Snaking around him on the library floor is an elaborate oak-leaf border of acorns, stems and leaves in 15 colors created in 15 woods from all over the world. The verawood in the acorns is a dark green, and the caps are the deep orange of cumaru. The border's 120 leaves are radiant, with bloodwood, wenge, pau amarillo, American walnut, Brazilian cherry, makore, African mahogany, American cherry, tulipwood, pear, oba rosa, chakte-kok, cocobolo and purpleheart catching the stark light and glimmering in all the natural shades of a forest.

Ten years ago, the border would have been impossible to craft. But today's computer-driven laser beams allow complex designs—oak leaves, roses, trains, anything really—to be cut and placed like pieces of a jigsaw puzzle into a wood floor.

Laser inlays aren't for the weak of wallet. Crispin charges $12.50 a square foot for a standard red-oak floor. For a classic parquet pattern—a Monticello or a Bordeaux—it's $20. For the library floor, he's charging $30 a square foot. The 4.5-inch-wide border alone costs $75 a linear foot—or $4,800 of the job's $8,000 price tag.

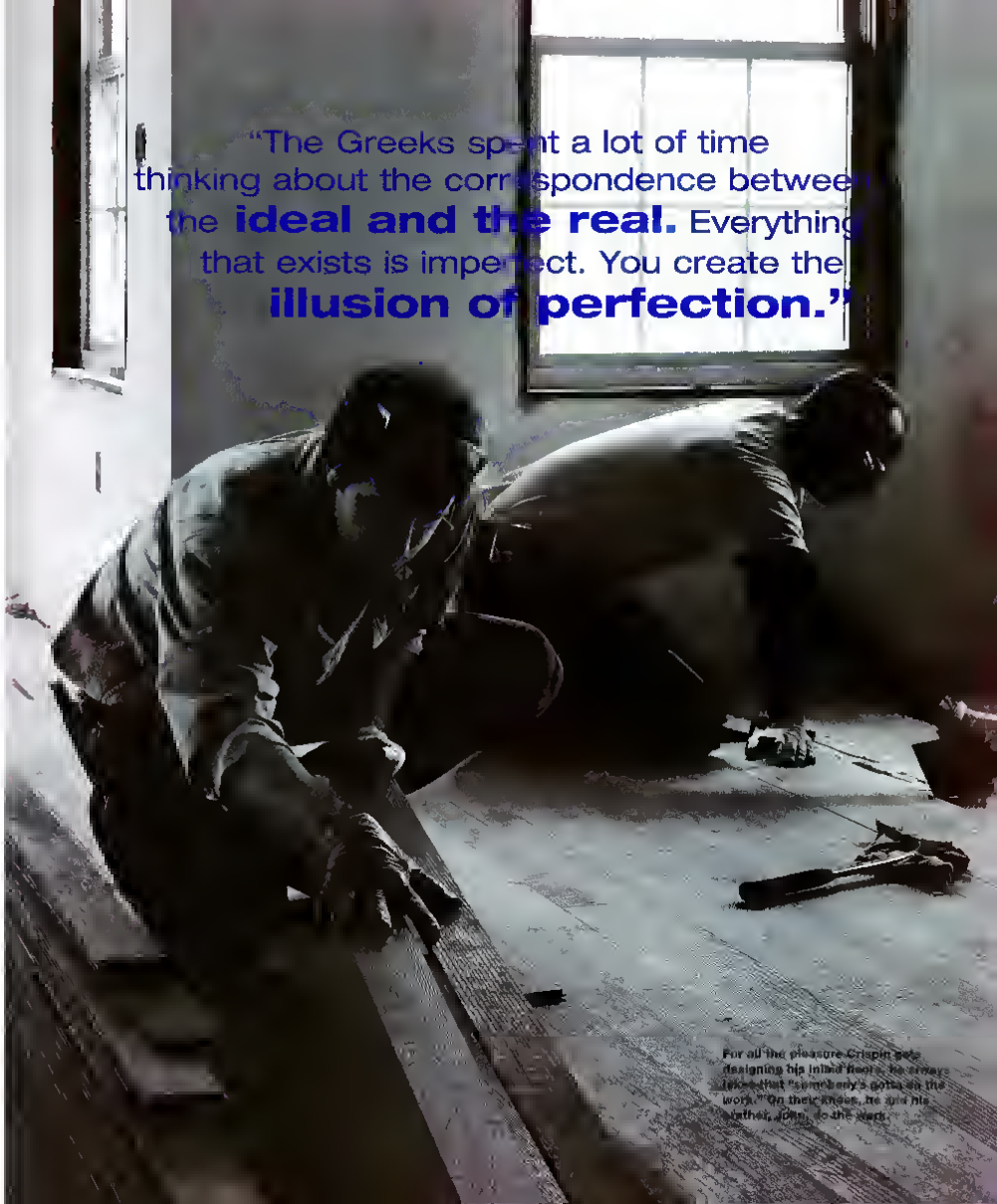
When the laser revolution was just coming ashore, Crispin jumped the first wave. The inlay work done by his tiny Legendary Hardwood Floors in his hometown of Terre Haute, Indiana, has twice won a Floor of the Year Award from the National Wood Flooring Association, and this year a 19th century trom pattern he laid in the floor of a child's bedroom won the Best Use of Wood Technology Award.

But technology hasn't changed the way Crispin sees his craft. In the everyday world of workmen, he's a rarity—a devotee of T.S. Eliot and Soren Kierkegaard, of Gabriel Garcia Marquez and Milan Kundera.

"I tried to be a philosopher and it just wasn't in me," he says. After earning his bachelor's degree in philosophy (with a minor in classics), Crispin just couldn't stomach the idea of more school, nor could he imagine himself ever working in, say, an insurance agency. "Not anything having to do with a bureaucracy."

It was the early '70s and Crispin was a free spirit. For two years, he worked in a foundry and saved money. Then he bounced around Europe for a few years, part of the time as a groundskeeper at an estate in Luxembourg with a 17th-century castle. When he returned to Terre Haute, he got married and had a daughter and a son. But with a degree in philosophy, he was virtually unemployable. So he began a small contracting business—decks, bathrooms, siding. It seemed a good choice. "The only thing that ever made me feel real was working with my hands," he says. Financially, it was tough. For five years, he went from little job to little job. "It was a grim life."

One winter when business was even slower than usual, Crispin refinished a friend's wood floor, a job he'd never done. "It was like changing water to wine," he says. "I was so fascinated, I couldn't wait to do it again." During the next few years, Crispin began to specialize in refinishing floors. Then, a decade ago, Alan Pyne of Brookfield, Wisconsin, hired him to lay a floor in a Terre Haute mansion. Pyne, a taciturn 70-year-old legend among wood floorers, set a standard Crispin hadn't known. "Cut it again," he told Crispin after he left a sixteenth-


"The Greeks spent a lot of time thinking about the correspondence between the ideal and the real. Everything that exists is imperfect. You create the illusion of perfection."

For all the pleasure Crispin gets designing his inlaid floors, he always takes that "somebody's gotta do the work." On their knees, he and his brother, John, do the work.

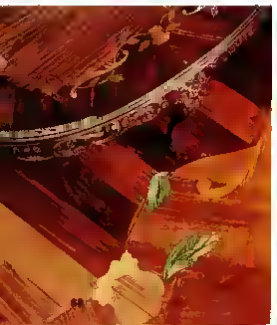
inch space between two boards. The second time he left a thirty second of an inch. "It's not tight enough," Pyne said. Finally, Crispin cut a piece so it had to be pounded into place. Said Pyne, "That's the way I want it."

The apprentice fell hard for the master's exactitude. "The kick, the endorphin rush, was the thrill you get participating in excellence," Crispin says. To Pyne's mechanical precision, Crispin grafted his own philosophical bent. "I don't want my life's work to be wasted. I want to do something durable. To Wordsworth, that's 'the intimation of immortality.'" Crispin laughs at himself. "We're talking wood floors now. But I'll take whatever little piece of immortality I can get."

Crispin created the inlay above for a client who asked him to depict the leaves and acorns of a red oak. The floral pattern below was designed to echo the marquetry of an antique table. Crispin called the work Meissel's Table, after clients Robert and Joyce Meissel, and proclaimed it his most elegant floor ever.

After learning about laser cutting with Pyne, Crispin began creating his own inlays. As an amateur poet, actor, painter and sculptor, he loved the artistry of designing new patterns, researching exotic woods to figure out which were strong enough, experimenting to find out what colors the woods would be after they were finished. "It was a way to combine my work and my creativity."

For himself, Crispin made a border in six exotic woods patterned on a design he saw in a St. Louis chapel built by T.S. Eliot's grandfather. For a 5-year-old boy, he created a train border in seven woods based on photos of the cars and locomotive that carried Abraham Lincoln back to Illinois after his death. For a couple who collect Native American artifacts, he crafted an inlay in nine woods that shows two Kokopelli dancers playing their flutes beneath a giant yellow moon.



Over the years, Crispin, with the help of his brother, John, and coworkers Mike Ward and Walter Bastian, has inlaid at least 50 exotic woods in floors, including Australian lacewood, Laotian jackwood and New Zealand rewarewa. He has learned through trial and error that snakewood is too dense for the laser. The laser cuts by burning through wood, which means that dense, oily or overly moist woods that take a long time to cut will be severely burned along their edges or can even burst into flames. He has learned that while American cherry costs $3 a square foot, bloodwood costs $25 a square foot, and African pink ivory is sold not by the square foot but by the ounce, like gold. He has learned that the grain in the leaves of his oak leaf border should always run outward from the stems to mimic the veins of a real leaf.

Eventually, Crispin learned to ask his clients about their lives. In the floor of one home, he copied the 18th-century marquetry inlay of a favorite antique table, adding roses, tulips and irises in 11 woods. After learning that Gabriel García Márquez was the favorite novelist of one of his clients, he inlaid the South American lignumvitae wood mentioned in the author's *One Hundred Years of Solitude*. Crispin fears he sounds pretentious, but he has come to think of his custom floors as narratives that echo his clients' lives. "T.S. Eliot says thought is the opposite of action, but I disagree," he says. "Ideas and their execution in reality are inseparable."

Consider the Oakwood Inn's library floor. Crispin walked into the room when its walls were still a skeleton of studs and its concrete floor was littered with construction debris. But he looked around and saw the new floor, the idea for it. That was the exhilarating instant. I can do this! Then he saw tainted reality—the walls out of sync, the fireplace off-kilter.

So he began calculating how to create the illusion of perfection. He'd center the corners of his oak-leaf border on the room's focal point—the fireplace—instead of on the walls. His ideal six-inch red-oak reveal around the border would be fudged at the doorway, adjusted a quarter inch along one wall, three-eighths along another. The 22.5-degree turn in the border would be cheated a hair along the wall that's too long. No, it wouldn't be perfect. "But when you walk into this room," Crispin says, "you'll need a tape measure to see it."

To install a wood floor right, there's a lot to know. Crispin dry-lays almost every one of his floors completely to be sure it will fit perfectly. The library's subfloor is concrete, so he decided to use a premium-grade quartersawn flooring that costs $3.80 a square foot compared with $2.40 for plainsawn red oak. In the high-humidity lakeside resort, the quartersawn boards will expand more up and down than across, diminishing ugly gaps and warping.

Before laying the floor, Crispin waited 60 days for the concrete to cure fully, which prevents moisture from seeping into the wood and causing it to warp. At installation in this Midwest climate, the wood must measure 6 to 8 percent moisture to limit gapping. When Crispin glues a floor over concrete, he pushes the tongue of each piece into the groove of the adjacent piece. That keeps the groove from acting like a spoon and collecting glue that then interferes with a tight fit. When laying wood floor over wood subfloor, he reverses the process and pushes groove into tongue, so each exposed tongue can then be nailed to the subfloor.

Nailing matters too. On oak or pine floors, a pneumatic nailer can be used. But on extra-hard woods like Brazilian cherry or cumaru, holes must be drilled in the tongues and nails driven in by hand. Otherwise the tongues will split slightly at each nail, making the floor squeak when people walk on it. Crispin even rips the grooves off pieces of flooring that run along the wall to eliminate weak spots that might crack if something heavy were dropped. Perhaps most important, he routs, slip tongues and glues all corner cut pieces to prevent their ends from cutting after a decade and to make the entire floor interlock.

Installing the inlays adds more complications. The laser beam, for instance, expands as it cuts through wood, leaving a wider cut at the bottom than at the top. That means Crispin must lather glue more heavily on the inlays than on the rest of the flooring so it will rise up into the cuts and secure the small pieces not only from the bottom but also along the sides. He can't use too much glue or it will seep up through the inlay's seams. Then he must check each piece to be certain it's centered within its cut. To eliminate scratches in the finish, Crispin uses a random-orbit sander. A smooth surface keeps the light reddish stain he uses to bring out the wood's highlights from soaking in very far, creating a sense of visual depth after two coats of polyurethane are applied. The floor is then buffed glassy with a 180-grit screen over a soft pad, and a final coat of polyurethane is brushed on.

Standing inside the oak-leaf border he laid out earlier, Crispin cuts the final pieces for the Oakwood Inn's library floor. "This part isn't wizardry," he says as a storm of tiny oak chips falls around him.

"The entire process is like a song, something complete in itself," Crispin says. He then gives this simple description of craftsmanship. "You get an idea, fiddle with it, make sure the execution measures up to the authenticity of the concept, don't have a failure in materials or workmanship, don't cut corners. A lot of guys have nice ideas, and then they leave an eighth-inch gap in their work."

"If you're not obsessive, you won't be a craftsman," Crispin goes on, pulling up his goggles, studying the cut he has just made, smoothing it with his fingers. "It's the difference between being a believer and being a fanatic. A believer goes to church and sings hymns and believes he's going to heaven. A fanatic sells his shirt, gives the proceeds to the poor and races off to convert the heathens. A real craftsman has to be a fanatic." He laughs. "The only thing sadder than a dying luxury car is a mediocre craftsman."

Crispin sees guys who make big bucks throwing down "gun-and-run" floors, laying 900 square feet in the time it takes him to lay 40. The money is tempting—last year Crispin earned only $21,600. "But I see guys who do that and I'm not sure they're happier. To me, there's something essentially, well, spiritual about my work and how it's bound up with character and how it's bound up with my own self-pride. To me, a great hardwood floor is as nice as a great church window. It's Walt Whitman—it's a song of myself." Crispin raises his arms in mock rapture and whispers, "The human choir!"

It's nearly midnight now. Crispin is tired and slouching. He

has sorted through a 997-pound pile of flooring, selected the pieces containing the most stunning medullary rays and laid them aside for placement in front of the library's fireplace. He has laid out the pieces of his inlay jigsaw puzzle.

Back down on his knees, he leans his weight on the knuckles of his left hand to secure the last of the corner pieces. He taps the tail of the board lightly seven times with his hammer until it's as tight as a cork in a bottle, then forgets his knees and sits back on his haunches, slumps his shoulders, rests his palms on his thighs and whistles like a teakettle. "I don't ask myself if it's perfect," he says. "I ask, 'Is it everything it could be?'" He looks at his floor. "This is as good as it gets."

See Directory, on page 123, for details and sources

BY JEANNE HUBER PHOTOGRAPHS BY MICHEAL McLAUGHLIN

Secrets of shellac

Searching for the source of a natural wonder

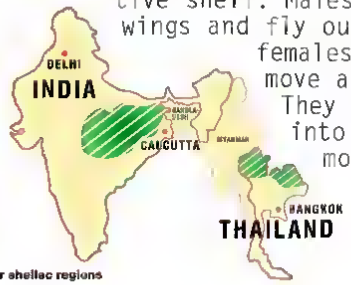
In a scene that hasn't changed for more than a century, Amulya Kumhar squats by a charcoal fire to purify shellac in Sundu, India. Heating and twisting a muslin bag stuffed with raw shellac, he catches filtered resin with a coconut-palm spatula and spreads the pitchlike substance onto a metal canister. Then Gobra Kumhar, left, pries the material loose and with his hands, feet and teeth, stretches it thin to create shellac. Refinishers and violin makers will dissolve the flakes in alcohol to create a durable finish that lets wood's beauty shine through.

Shellac is a resin. It can be softened with heat and molded like clay, or dissolved in a solvent and spread whisper-thin. Old phonograph records are made of shellac, mens' hats are stiffened with it, and it gives supermarket apples their shine. Gummy bears and many prescription pills are coated with shellac.

A crusted branch, ready for harvest

Every bit of the substance comes from the sweat of a tiny red bug that lives on tree branches in Asia. Closely related to the insects that infest roses and other garden plants, *Laccifer lacca* emerges live from its mother's body, crawls to a juicy stem, sinks in its mouth and through its skin begins to ooze a sticky substance—pure shellac. The goo hardens into a protective shell. Males grow wings and fly out, but females never move again. They evolve into little more than sacks where babies grow.

The juvenile lac bug



Major shellac regions

The lac bug is not particularly choosy about where it lives. The Indian Lac Research Institute in Ranchi displays specimens from California, and archaeologists in Arizona have dug up shellac ornaments from prehistoric graves. But shellac is worth harvesting only where the climate allows the insects to thrive so that their crust forms a continuous mat on branches. And the economy must be so poor that villagers are willing to cut down the branches and scrape off the crust. Today, China makes some shellac, as does Thailand. But only in India do thousands still depend on it for their survival. *Laccifer lacca* flourishes so well there that the bug's name has become a counting measure: One lakh of anything is 100,000 units.

The world supply of shellac sometimes starts with children like 12-year-old Melwa Munda, center foreground in the crowd above, who scrapes a few cups of shellac crust from plum branches, then walks to an open-air market near Khunti, below, and trades his bag full for 3 rupees, about 10 cents. Below left, buyers weigh the crust.

Plum trees host lac bugs in India.

The stench of decaying bug bodies is intense as workers at the Mahabir Shellac factory in Balrampur use squares of muslin to retrieve kirilac, the lowest grade of shellac, from wash water.

Villagers carry 70 pound loads on their heads and wade into vats of red goo that smell like manure to transform sticklac, the bug crust, into an industrial commodity. Sticklac is only about half pure shellac. Using machines that rumble with the rhythmic thudding of a cement mixer, workers grind the sticklac to the size of dried peas. They sift out the bark and wash what's left in rotating drums or open concrete pits. Decaying bug bodies turn the wash water deep

A worker cleans and mends muslin filter bags so they can be reused.

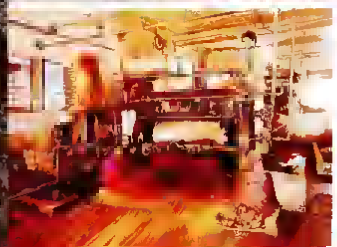
red, producing a dye that once tinted Indian soldiers' uniforms and still colors Oriental carpets. Now called seedlac, the shellac resembles soggy Grape Nuts.

Seedlac fresh from the local market is crushed and sifted.

Shellac leaves India as flakes or grains called seedlac. Fresh from washing, the seedlac needs to be dried in the sunshine and winnowed. Women with shallow wicker baskets scoop up handfuls of the kernels, toss the grains upward and catch them again and again to remove bits of bark and dirt.

On a 105-degree day in Sultu, Tulsi Bala and Shanti Devi stir seedlac to keep the grains from melting and clumping as they dry.

Although shellac flakes are still made by hand in about 100 factories, most of what's shipped to the West comes out of hydraulic presses and roller machines. But the process is still labor-intensive. Dayal, right, wraps himself in a scrap of cloth so his clothing stays clean while he tends seven of the coal-fired presses, which melt and filter the shellac. Below, from left, women kneel at either side of the roller's mouth, pulling out the edges of the taffy-like shellac so it stays in a smooth, yard-wide ribbon. A woman carries a section across the room, letting it drip onto the floor to cool. Later, she will whack the ribbon with a willow branch, breaking it into pieces. The result: a 110-pound bag of flakes, which the factory owner will sell for about $200.



When it goes to market the first time, fresh off the tree, shellac is usually carried by foot. But when it leaves the factory, flake shellac is so fragile it is hauled in refrigerated trucks. Too much heat or excess pressure will cause the thin, crisp flakes to meld into solid blocks. In Calcutta, burlap bags are opened and the contents sampled for quality. Then the shellac is reloaded into fresh bags and piled into shipping containers that tractor-trailer rigs will pull down the interstates of the United States. The world's biggest shellac firm, Wm. Zinsser & Co. of Somerset, New Jersey, sends much of the shellac it buys to its factory in Attleboro, Massachusetts. There, where turning a profit hinges on employing as few people as possible, about 20 workers bleach and dewax tens of thousands of pounds of shellac each day. The plant, inspected regularly by rabbis to retain its kosher rating, sells most of what it processes to coat food and medicine. Some makes its way into cans of shellac. Most of the shelf space in hardware stores goes to polyurethanes—they're tough and reliable. But shellac is easier to repair, dries in less than half an hour and doesn't yellow. No manmade (and potentially toxic) compounds are involved. And the resource is endlessly renewable.

Researchers at Zinsser are trying to develop an apple polish of shellac for the Japanese market, where buyers prefer less glossy fruit.

WHAT $1 A DAY WILL BUY

Thursday is payday at the Parwati factory in Khunti. Women wearing saris and men in loincloths line up behind a table where factory managers mark a ledger book as they hand out cash. The pay is $1 a day for women, $1.10 for men, with 10 percent deducted for a social-security account. Sugiya, standing in the middle directly behind the table, walked away with 152 rupees, about $5, for 9½ days' work. With two friends, she scoured from seller to seller at the local market, spending half of her pay as she filled one big shopping bag with bananas, seven kinds of vegetables, four seasonings and a dozen pastries, and a second shopping bag with six quart-size containers of dry white rice. The rice cost 42 rupees, a quarter of her pay. When her bags were full, she and her friends splurged on a couple of cups of rice wine.

Seedlac is transported in ordinary trucks like this—gaily-painted vehicles with "Honk Please" lettered on the back.

Victorious Lady

An inspection of the season's new TV project reveals a dowager that has survived the years with considerable grace

Nantucket is charming, but shortly after stepping off the ferry, a visitor runs headlong gray-shingle Dutch Colonial–style houses clad in weathered cedar shingles stand everywhere on this upscale resort island. These homes are handsome, romantic and coveted, but the overall effect can be (whisper it) a touch too predictable.

So here and there, it's a pleasant surprise to find an anomaly: a pink facade, a Victorian manse or our new fall project house, a modest white Victorian.

On a sparkling day with a relentless wind from the southeast, Steve Thomas, Norm Abram, designer Jock Gifford and contractor Bruce Killen assemble in the house's yard to inspect the place. It's the first

BY BRAD LEMLEY PHOTOGRAPHS BY JOSHUA McHUGH

time Steve and Norm have seen it. The aim of these four men is practical—to determine how successfully the house has aged since its construction in 1887—but also pleasurable. "I love the archaeology of the process, trying to figure out why something was done in a particular way," Steve says.

Their first task is to evaluate the house in the context of its neighborhood. Nantucket real-estate prices can induce hypoxia. Craig and Kathy Bentley paid $481,250 for the 2,272-square-foot fixer-upper that would cost perhaps $150,000 in suburban Boston.

But the house fits a couple of good real-estate investment maxims. First, it's got location, location, location. Built on a narrow, tree-shaded street, it's a six-minute walk from the center of Nantucket Town, a 10 minute stroll from the ferry and 15 minutes to the nearest beach. Second, it's among the least expensive houses in the neighborhood, "the dog of the block," says Steve, waving an arm at the nearby homes, all gray shingled, all more than a century old (except the clever 1959 Federal style reproduction directly across the street). "It's surrounded by carefully preserved and maintained houses. It's clearly the one that needs some tender loving care." Realtors say the average price for homes in this neighborhood is $700,000, so the planned $250,000 renovation won't price it out of the market.

Norm notes that cosmetically the house's exterior is tough, with paint peeling from the clapboards and a concrete veneer popping off the brick foundation. The house also has perhaps the only vinyl shutters remaining on this authenticity conscious island. To Norm these are minor flaws. "I always look at structure first. Are the walls bowed out, do the horizontal lines go up and down, are there sags in the roof?" Squinting at the south side, he traces the roof's ridge in the air with his finger. "There's a little sag from the left chimney to the back end and a little to the front, but it doesn't look too bad."

He crosses the sandy yard to the back of the house and sights along the south wall. "The top of the wall is kicked out," he says, meaning that the upper part is about five inches out of plumb. It was pushed out as the roof dropped and spread. "I've seen a lot worse than that. If that's all it has moved in 109 years, it's holding up pretty well."

The wooden gutter is split and rotted, and water has apparently leaked into the walls, but overall, Norm says, the water damage is minor. He squats next to a section of the foundation and measures the distance from grade to the lowest clapboard—27 inches. That height protects the sill and the clapboards from splashing water, snowdrifts and insects. "On every house we've looked at in the 18 years we've been doing this, most of the damage has been from water," Norm says. "This high foundation is one of the big reasons the house has held up so well."

Killen, meanwhile, is reminiscing. This is fat from the first time he has seen 3 Milk Street. Born on Nantucket, Killen remembers crawling under the plank fence, now falling apart, on the lot's western boundary. "When we were kids, we used to roar around in this yard." The house's quirkiest external feature, he says, is that it has shingles on the front and clapboards on the sides—precisely the opposite of Nantucket tradition. Because clapboards were (and are) more expensive to buy and maintain, they were generally put on a house's facade, while the back and sides were covered with cheaper, unpainted shingles. A 1920s photo from the Conway family, who lived in the home for 100 years, shows this unusual siding arrangement has been in place for at least six decades. Why is anyone's guess. "I don't know of any other house on Nantucket that's like this," Killen says.

Before heading down to the basement, Gifford walks the boundary of the yard. It's a mess. There's no landscaping at all, the lawn is a scruffy melange of quack grass, dandelions and sorrel. Worse, the

PHOTOGRAPH COURTESY THE CONWAY FAMILY

Catherine Conway, holding daughter Florence in 1928, lived in the house until last year.

109 Years

According to the Nantucket *Inquirer and Mirror* newspaper, the house at 3 Milk Street was constructed by George Gothcart Pratt in 1887. The next owner, Captain John Patrick Conway (1852-1919), took possession on July 23, 1895. The home remained in the Conway family for the next 100 years.

The captain's grandson, John Sydney Conway, 89, grew up in the house with his five siblings. "My grandpa made 33 trips around Cape Horn, probably more than any man who ever sailed out of Nantucket," Conway says. The front parlor was called the "Orient Room" because it was filled with silks, china, swords and artwork the captain brought home from his years in the China trade. Conway remembers his grandmother, Teresa Estelle, telling him that this Victorian "was the kind of house Nantucket should be moving toward." But Elizabeth Oldham, research assistant for the Nantucket Historical Association, says Nantucket's whaling economy was "absolutely flat" from 1840 to 1880, the heyday of the Victorian period. The result, she says, is that there are no more than a dozen Victorian homes on the island.

Catherine Conway, the captain's daughter and Conway's mother, lived in the house her entire life, she died in April 1993 at the age of 98. Says Conway, "It's exciting to see the house come alive again."

Dangerous chimneys

Both interior chimneys are drastically corbeled—that is, the brick courses were stair-stepped by the mason to form a slant. The cant of this one is so severe as it passes through the attic that it's propped up by some pine boards. "They wanted the chimneys to come through the peak of the roof," says contractor Bruce Killen. "That let them avoid having to flash them." The renovation plan calls for their removal.

Splitting gutters

Norm inspects the kitchen's sorry southwest corner, where the wooden gutter and soffit are split and rotted. The culprits: nearby elm trees, particularly the 49-foot specimen that arches directly over the one-story kitchen. "The worst thing you can do is have trees this close to any house," Norm says. "The leaves fall in the gutter, no one bothers to clean them out and they make a wet mess that dams up the gutter. Water collects, it freezes, the joints break open and you have a big problem. If that tree hadn't been there, the damage probably wouldn't have been so severe."

Water damage

All the wood in the cellar is damp to the touch, and both the subfloor and joists have decayed patches. The worst rot is beneath the toilet. "The toilet doesn't have to be actually leaking for that to happen," Norm says. "It can be caused by years of condensation dripping from it."

Crumbling veneer

The brick foundation's exterior is covered with a coat of concrete inscribed with lines to resemble stone blocks; the builder's aim was to create a more formal look. Killen examines a spot where the concrete has popped off, probably because of years of freeze-thaw cycles. The problem looks worse than it is. A mason can easily patch the holes in a couple of hours.

Rotting floors

Steve checks the damage in the front parlor, where a steam radiator has leaked around its feed pipe. The dribbling water rotted the floor, which in turn sagged under the 250-pound radiator. The radiators were likely added in the 1920s. Even without such leaks, the lightly framed floor was never meant to bear such loads.

6,000 square-foot property slopes toward the house. "We want the drainage to run away from the house. We're going to have to fill in a lot here," the designer says.

Bad as it is, the yard was a major factor in the Bentleys' decision to buy. In town zoning requires just five foot setbacks on a house's sides and back and none at all in front. Many homes this close to town don't have yards. This property accommodated the Bentleys' desire to be near town yet have a spot for their two children to play. "And it will be wonderful for the Bentleys to have parking space. Parking on Nantucket is very tough," Steve says.

A bedraggled bulkhead on the kitchen's west side leads to the cellar. It's stygian dark, damp and cramped, with just six feet of headroom. But instead of dirt under foot, the floor is brick roughly parged with concrete. It's so rare a nicety in a house this old that Killen theorizes "there's got to be a pot of gold under there."

The sizing and spacing of the floor joists is frugal, a combination of 2x3s and 4x5s laid up to three feet apart. But the original builder was also canny. He put brick columns in the center of the narrow basement so that his skimpy lumber would span only six feet. "I've worked in places that had this kind of lumber spanning eight or ten feet," Norm says. "As long as we aren't going to put ceramic tile on the floors, there's no real need to worry." Even so, he says, it may be necessary to jack up low places and "sister" a few new timbers for added strength by nailing them face to face onto the old ones.

The brick foundation is largely plumb, square and free of cracks. "This foundation is solid enough that we can build right on it. That's going to be a big saving," Norm says.

The basement, like the rest of the house, appears to be frozen in time. The only evidence of updating is a 100 amp circuit breaker box and an oil furnace. The wires are Romex, a modern plastic-coated style, and the furnace is not more than 20 years old. The furnace may be usable, especially if the place is occupied primarily in summer. But the fuse box has to be replaced. "Most people these days go to 200 amps," Norm says, particularly if the plans call for an electric dryer. Given the extensive renovations, he says, "the whole electrical system will need to be updated."

The men exit via the grimy bulkhead steps, troop once again through the south yard and enter the first floor through the front door. The house's interior follows a typical pattern of the period. The front rooms were the most public and formal and received the most expensive materials and labor. The front parlor, brilliant with morning sun from the east-facing bay window, features the fanciest trim, as well as a plaster rosette in the center of the ceiling and built-up plaster crown molding. But the floor is a mystery. Normally, this comparatively elegant room would have elegant flooring, perhaps oak with an artful inlay. Instead, it has cheap spruce planks painted gray. Killen suggests a carpet may have covered it.

Back in the second parlor, the trim is simpler. Here, the flooring is quartersawn yellow pine framing a center square of spruce. "A rug would cover that spruce section," Killen says, "so they saw no need to waste good wood there." He notes that neither parlor has a fireplace. "There was no firewood on the island." Coal stoves attached to the house's two chimneys probably provided heat until the oil furnace was installed.

Standing in the maple-floored dining room, Norm points to the top of a doorway that leads into a bedroom. It slopes from left to right. The right jamb has dropped because of a pipe pierced, sagging beam he noted in the cellar. But running a hand along the plaster walls, he judges them free of any cracks that indicate major settling.

Norm tugs on a window sash, but it doesn't budge. Like all the other windows in the house, it's been painted shut. "In Nantucket in the summer, you want to be able to open the windows and let the great breezes through," he says. "You could replace the whole sash, but then you would lose the wonderful ripple effect you get with this old blown glass." His idea: Remove the old sash, then put vinyl-coated, spring-loaded channels called jamb liners on either side of the window opening. Trim the sash so it will fit the now smaller opening and install it in the jamb liners.

To this point, the men have seen the house as a modest, only slightly disheveled dowager, but in the kitchen, faces fall. It looks terrible. The narrow, one-story room on the back of the two-story house seems at first glance to be a shacklike addition. But Norm's careful study of the foundation's brickwork indicates it is original. Water stains on the ceiling betray leaks, and the floor is ripped, stained sheet vinyl from the 1950s. The house was built just before the turn of the century, when popular magazines urged builders to make kitchens larger and more centrally located. The architect's plan, sensibly, calls for this room to be torn off. There will be a family room here, with a master suite above.

Finally, the group ascends the narrow stairway in the front of the house. Upstairs, there's a large central room with a front bedroom, a back bedroom and a side-attic storage area radiating from it. Incredibly, in 109 years no one has seen fit to put a bathroom up here. (John Conway, who grew up in the house, says the family repeatedly tried to persuade his mother to install one, but

BENTLEY PHOTOGRAPHS BY JAY D. KATZENSTEIN

The New **Owners**

Kathy and Craig Bentley, the house's new owners, have worked and traveled in some 60 countries. Craig as an international banker, Kathy as an attorney for an oil company. Together they have traveled as volunteers for the International Rescue Committee, a refugee-rights organization. Of all the places they've been, Craig says, "Kathy and I, independently, had the feeling of coming home when we went to Nantucket." Says Kathy, "It felt far enough removed to be exotic, yet it's not all that removed or remote." The house on Milk Street "struck us as the perfect house to redo," Craig says. They felt ready for the challenge, having recently overseen the construction of their 5,000-square-foot Colonial near Boston. Their aim with this renovation, Kathy says, "is to preserve the home in its original state, while still enjoying some of the creature comforts of the '90s." Their larger goal is to make the place a family gathering spot. "We see it not only as a vacation home but are looking at the possibility of living here year-round," she says. "We hope our kids will spend summers with us, working on the island, instead of running off."

Victorians typically have exuberant details, but this house could be called a "folk" Victorian. Lacking the skills and budget to create an intricate facade, Nantucket carpenters used simple half-round molding to create diamonds on the bay-window panels. Killen says the other details, such as the scroll-work brackets over the windows and a massive carved newel post, may have been purchased from the Sears catalog. "In the 1920s, they had whole Victorian packages you could buy."

"she liked the place the way it was.")

The upstairs provides an insight into Victorian notions of architectural propriety. Each bedroom is foursquare, without the slanting ceilings that would allow the floors to extend under the roof's slant. The concern comes at a huge cost in this modest house. The bedrooms are three feet shorter than they could have been. "They were funny about a foursquare room versus a tapered one," says Killen. "Tapering just wasn't formal enough."

For the purpose of the inspection, the unfinished storage area is the most interesting room on this floor. Peering down inside the south wall, Norm notes that the house is balloon-framed, which means the studs are continuous from the foundation to the roof. This kind of framing is seldom done today, partially because it's a fire hazard—the stud bays act like chimneys, allowing fire to spread rapidly between floors.

The stud bays, the roof, the whole house seems to lack a shred of insulation, astonishing in a location where winter temperatures can hit zero and winds are ruthless. Norm says this is another reason the home is so well preserved. "These old uninsulated homes are so drafty, that's what saves them. As soon as you stuff insulation into these walls, you trap the moisture and they start to rot, unless you get good vapor barriers on the interior walls."

The builder's frugality is evident here too. The rafters are 2x3s, 32 inches on center. That's woefully underbuilt by today's standards. A modern engineer would specify 2x8s, 16 inches on center, and add truss-bracing to keep the roof from spreading. Yet, sighting with one eye along a 16-foot rafter, Norm notes a sag of just an inch and a half. He and Killen theorize the roof has held up so well because of its steep pitch. It's a 12-12, meaning it has 12 inches of rise for every 12 of run, so it slants at a 45 degree angle. (Another possible reason: Stephen Goan, project engineer for Aberjona Engineering in Winchester, Massachusetts, says first-cut lumber from the 19th century is typically 30 percent stronger than the second- or third-growth lumber now available.)

Steve says using scavenged lumber for framing members was fairly common when the house was built, but this builder used it even for roof sheathing. A look overhead reveals a crazy quilt—some boards are wide (one measures 26 inches), whitewashed and pristine, but many are narrow, plain and gray with a coating of ancient mud.

With the inspection over, the men congregate on the front stoop, which by now is in deep shadow. Overall, this Victorian has impressed them, but Steve has seen more than one renovation begin with a generally optimistic inspection and spiral into a budget-busting ordeal.

"My impression right now is that they are going to have be wary as they proceed. I have the feeling this house could soak up a lot of money," he says. "Early on, the homeowners will need to nail down the costs they can control: fixtures, floor coverings, cabinets and so on."

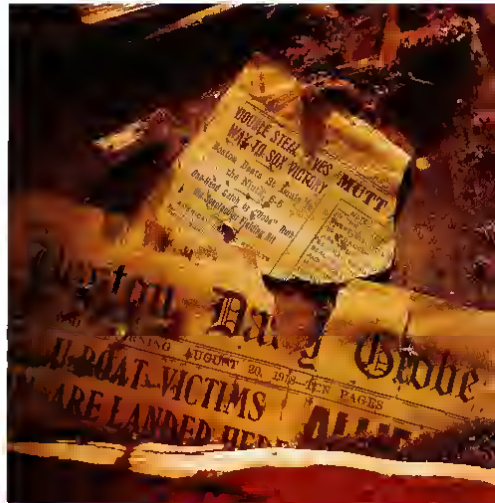
"This house reminds me of my own. Like this house, mine was patched together with found materials," Steve says. Although much of the 1836 building seemed superficially sound, "every time I opened up a wall, floor or ceiling, it needed to be reframed."

Steve likes the place, he finds the small details charming. But before the endearing house on a romantic isle completely captivates everyone, he urges a reality check. "I would prepare myself for this building to surprise me."

See Directory, on page 123, for details and sources

The Babe in **Boston**

Before Bruce Killen pried up the old maple floor in the dining room, he figured it had been installed in about 1920. He was right. Between the maple strips and the pine-plank subfloor, he and Norm found a layer of *Boston Daily Globe* newspapers dated August 20, 1918, containing a description of a formidable new German tank and a glowing account of a one-handed catch by Babe Ruth that earned the Red Sox a 6-5 win (yes, Ruth played briefly for the Sox before his 1920 trade to the Yankees). These days, rosin paper is laid down between the subfloor and the finish flooring to inhibit drafts and squeaks. Carpenters in 1918 found that newspaper served the same functions less expensively.



Set in stone

A wall of substance lasts longer than its builders

With the help of Jonathan Vincent, a friend of the family, Rico D'Eramo dresses a stone before setting it into the face of a wall. "Sullen stones obey you, some don't listen," he says. Using such lessons and the example of his 55 years in the trade, D'Eramo has taught stonemasonry to his sons, Vincent and Robert.

A stonemason has powerful incentive to do good work. Even a second-rate wall may last 50 years, and a careless mason could spend a lifetime averting his eyes from a botched job.

Nor would he forget whose mess it was. "Everybody's work is different," says Rico D'Eramo, 76, who laid his first stone in Italy at the age of 10. "You hear a voice; you know it's Pavarotti."

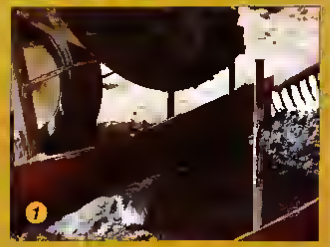
So D'Eramo and his sons, Vincent, 47, and Robert, 44, are taking great care, as always, with this wall in Weston, Massachusetts, tucking each stone into its bed of mortar so it will sleep there for a century. It is a low, double-faced patio wall with just enough mortar to hold it straight and strong. Using too much mortar is like cheating, Robert says, and detracts from the natural look.

A novice admiring a stone wall may not consciously understand why he finds it beautiful. But a mason like Rico D'Eramo knows, having trained his eye, mind and hand with literally tons of experience. Driving past a wall, he sizes it up in a flash, noting the relationship of each stone to its neighbors, the neatness and consistency of the joints and the artful use of mortar to stitch the stones together. Then he calls out his verdict—"This is a good wall" or "This wall is painful on my eyes."

"The more perfect the work, the more you can focus on little mistakes," he says. "When it's done right"—He puts finger and thumb

BY JACK McCLINTOCK PHOTOGRAPHS BY DAVID BARTOLOMI

the art of the fit



Even a low wall must be set on a sturdy foundation to keep it from toppling due to frost heave and soil movement. This one rests on a 3-foot-deep foundation of crushed masonry stone topped with steel-reinforced concrete. The first course of stones is laid before the concrete sets, bonding wall and foundation.

This is a double faced wall, more complicated to build than a single-faced version. The 15-inch space between the two outer faces is filled with rubble. Masons learn to think before they lift, a cubic foot of stone weighs nearly 100 pounds. Even so, many stones are handled six or seven times before they find a home.

together and flips them open in the quintessential Italian gesture of love.

The D'Eramos, father and sons, travel together. They arrive at the site with their tools, a truckload of select Connecticut fieldstone (mostly soft granite, $150 a ton), a wheelbarrow and a muscular, tattooed helper to mix mortar. From the truck emerges one more necessity: bowls of fresh peaches, grapes and figs to snack on in the sunshine.

They sort the stones carefully. Those with flat surfaces, pleasing grain and 90-degree angles go into special piles. These are reserved for positions of honor in the top and corners of the wall. Inferior chunks get tossed in a heap. They will fill the wall's interior and never see daylight again.

Then, gloveless and with only sneakers to protect their toes, the D'Eramos go to work. They keep the area neat—"Don't stand in your work," Rico says. They dig a trench, build a foundation and begin laying stone. They joke and banter and argue. "Working is good for you physically, mentally—and financially," says Rico with a grin. The sons roll their eyes and call out a few gentle insults. But all the while, the wall grows taller.

Rico taught his sons in the order he learned: first to haul water, then to mix mortar, rake joints, break stones, build the back of a wall, then the front. Finally, they were allowed to weave the complex top and corners.

Vincent drops a stone with a mutter. "*Fascus brutta*," he says. Ugly face.

Robert knocks a wobble knob off one stone, then neatly splits another. He scoops up mortar with his trowel and sets a stone in place. "You take pictures of the wall in your mind," Rico says. "Then you go find the stones that fit."

"There's no reason to build a wall unless you want it to last forever," says Robert. "You pay peanuts, you get monkeys." The son has inherited the father's taste for aphorism.

Late in the afternoon, Rico pauses, beckons and holds up his aging trowel, its steel blade stone-ground to half the length of the ones Robert and Vincent are using. Next to the worn trowel, he holds up his hand, the stubby fingers strong and whole. He nods from one to the other. The steel wears out, he seems to say, but the flesh never does. And he glances over at his two sons, building the wall.

Good masons use stone economically. "The old Italians are like the old Yankees," Robert D'Eramo says. "Everything gets used. They never leave even a pebble on the site."

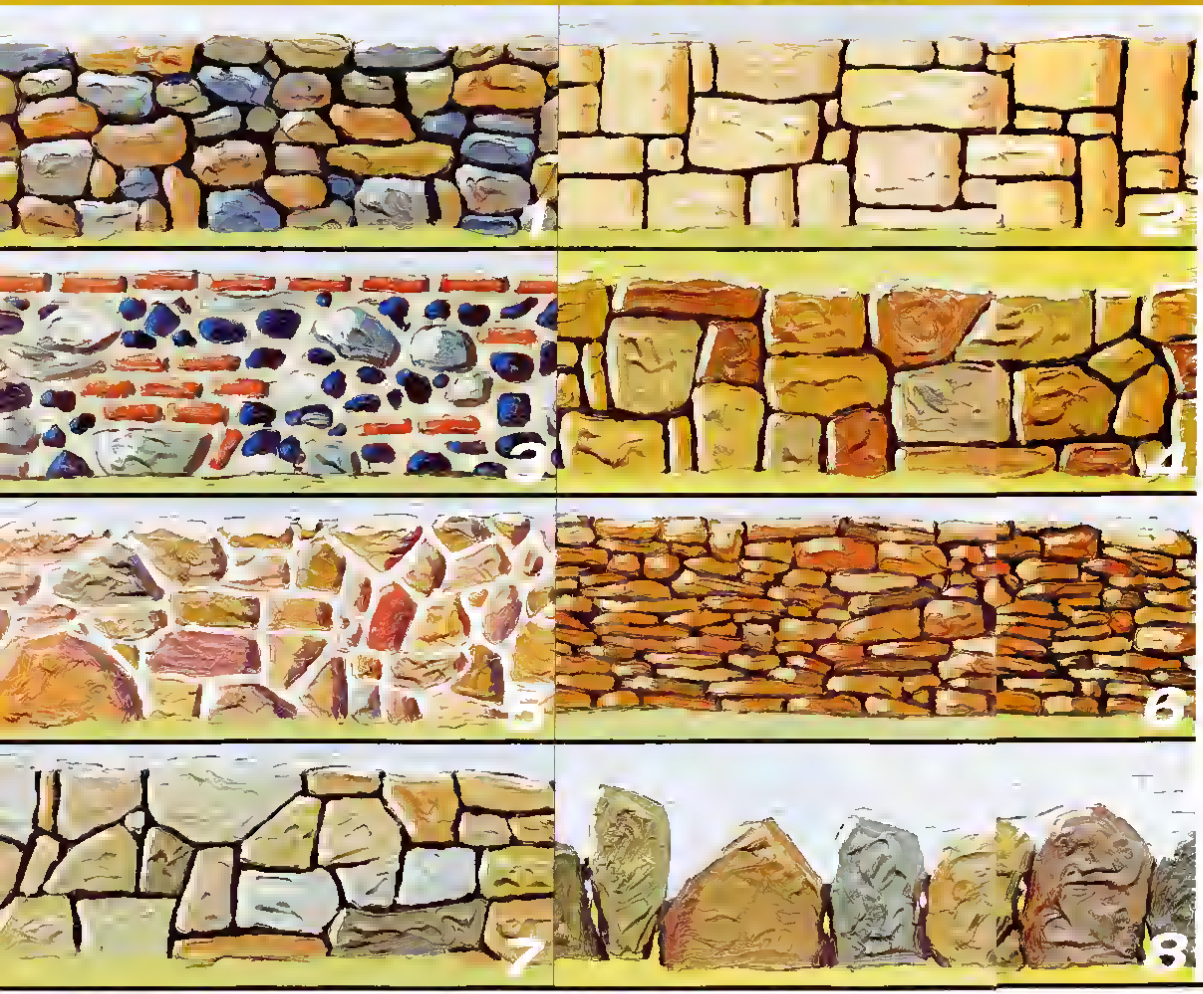
LEFT: The mason staggers stones as if they were bricks ("lay one on two, and two on one") so that the joints never form a straight line or cross, a sign of weakness and poor craftsmanship. Some longer stones are turned inward and extend through to the other side of the wall, adding strength.
RIGHT: This is a 23-inch-high "sitting wall," low enough to preserve views but high enough to rest on. For comfort, it's important to keep the wall level. The D'Eramos do this by setting stakes at either end and at the center. They mark the height on each stake and run string as a guide.

LEFT: Some masons put all the large stones near the bottom so they won't have to lift them. The D'Eramos prefer a more random look, keeping proportionality between stones. If they split a large one, they never put the two halves where both can be seen at once. Instead, they save one for the other side.
RIGHT: Even when using mortar, a good mason tries to fit stones perfectly so the wall looks as natural as possible. The D'Eramos rake excess mortar from the exterior joints of this semidry wall with a stick—the one tool you don't have to carry from job to job, Robert says.

hard rock cachet

ILLUSTRATIONS BY JOHN FERRY

If stones were like bricks, every wall would look the same. But stones differ by region and type, ranging from the hard granites of New England to the subtle sandstones of the Midwest to the fossil-bearing limestones of the Florida Keys. Because of that—and because different situations call for different boundaries—walls vary too. These drawings illustrate eight of the most common types.



1 Dry-Stack Boundary This wall creates a lot line with whatever stone is at hand. Simply stacked without mortar, it is also known as a thrown up wall. A boundary wall is usually tough, without a cap or top line of carefully chosen stone. It can range from a glorified rock pile to a highly refined creation, depending on the skill of the mason. A finished boundary wall has a flatter, more carefully selected top course of stones for a cleaner look. A double faced boundary wall is two or even three stones thick, with a face on either side. In any dry stack wall, some annual movement—and thus some annual maintenance—can be expected.

2 Dressed This wall is built of shaped or cut stone, carefully joined for a refined appearance. It is a labor intensive and therefore expensive style, requiring great skill to build. In this example, the stones to the right of center have not been staggered carefully and present a weak joint running from top to bottom. This type of construction is also known as an ashlar wall.

3 Knapped Flint The beauty of this wall is the hodgepodge of materials used to make it. The primary ingredient is flint stone, a particularly hard type of quartz, which is split (or knapped) and set in mortar. Brick, tile and other types of stone, often large boulders, are also incorporated and set at odd angles.

4 Semidry Also known as a dry-look wall, this type uses mortar to stitch stones together from the inside or back. Surface mortar is scratched away for a natural appearance, as if the stones were merely stacked. It is a permanent wall that should never need maintenance. The double faced version has two outer faces and an interior filled with rubble, like the low wall shown being built on the previous pages. Because water can drain from the interior voids through channels called weep holes, winter ice should not crack or explode the wall. For stability, the wall must be built on a foundation deep enough to reach below the frost line.

5 Wet A carefully made wall in which stones are cut and fitted with exposed mortar and consistent spacing. Many fireplaces are built this way. The trick is in the spacing. The weight of the big stones tends to force out the mortar, so they must sometimes be stabilized by masonry wedges. The D'Eramos use bits of brick, which maintain necessary spacing and absorb moisture from the mortar so it won't run down the stone's face. A wet wall can be built of flat stone, fieldstone, rustic round boulders or cobbles. Because the wall is solid, through-wall drainage must be provided. Often, a wet wall's mortar is dark in color and recessed slightly to create interesting shadow patterns and emphasize the stones. As a rule, this type of wall has a contrived appearance and should not be built in places intended to look natural.

6 Pennsylvania Flat-Stone A low, semidry wall made of fieldstone (also called a New York flat stone wall). Natural looking, it can be the most expensive of all to construct because it uses small stones, which require a lot of time and labor to cement together. Except in Pennsylvania and New York, the stones must be imported.

7 Semidry Retaining Because it supports a soil embankment, only one side of this wall is visible. To improve drainage, the soil side is often backfilled with gravel. For strength and aesthetics, the wall is angled slightly toward the embankment—about one inch per four feet of height.

8 Boulder The least formal stone structure that can still be called a wall. Often used to mark a property line or erected purely for decoration, it is made of whatever large stones are available, rolled into place in a row. Vegetation quickly fills the gaps between boulders.

See Directory on page 113, for hotels and resorts

life in a concord barn

Revisiting an heroic This Old House *project few viewers will ever forget*

Across Interstate 93 from the site of the Concord barn, Lynn and Barbara Wilkinson built a home to convert it almost entirely to their liking and Massachusetts, proper. Working with *This Old House*, they retained the crumbling structure with the post-and-beam rustic design made for living with soaring spaces, an endless play of light and shadow, and efficient, simple

not have been the most celebrated building ever on television, but it was the only one resurrected with such stunning success. During the late 1980s and early winter of [illegible] *This Old House* was the only [illegible] barn in Concord, and each [illegible] spaces, a "rare new post-and-beam [illegible]. "The Concord barn was [illegible] executive producer Russ Morash. "[illegible] think of any that so [illegible] imagination. It may be because everybody dreams of living in a barn."

WILLIAM T. SCHELLER · PHOTOGRAPHS BY LUCA TROVATO

Before the Barn, there was the barn. The Wickwires—Lynn is in mutual fund marketing, Barbara directs a school for emotionally troubled girls—were living in a modest Victorian on a winding, rural-turning-residential road in the historic Boston suburb of Concord. The old red building stood on their property. "We used to walk over and look out on a pond that we couldn't see from the house because the barn was in the way," Barbara Wickwire explains. "If we lived here, we thought, we could see this every day." Converting the barn had been a long-standing "pipe dream," as Lynn tells it. But it was the sort of pipe dream that led the couple to eventually ask, "Why not?"

There was a stark answer to that question, implicit in the structure's timbers. At about the time *This Old House* began preparing to chronicle the realization of the Wickwires' dream, an inspection revealed that decades of neglect had made even a drastic renovation impossible. The posts and beams were lost to dry rot, and powder-post beetles were feasting on the remains. The construction project, and the television series, would be about building a new barn on the foundation of the old.

The heart of the barn redux would be the ruggedly intricate new post-and-beam frame that New Hampshire master framer Tedd Benson and his students would erect on site, in 19th-century barn-raising style, with ropes and pike poles. The frame was the star of every subsequent show. As it grew, it came to define the barn's interior, with its spacious great room, radiant-heated tile floors and striking master staircase. Once in place, it supported the prefabricated panel skin of the structure while configuring the interior walls into a soaring white web of cleanly defined rectangles, triangles and trapezoids. It was impossible, thanks to those great timbers, to forget that this old-new house was sired by a barn—that it was, in structural fact, a barn itself.

Lynn and Barbara Wickwire have lived in the Concord barn for nearly seven years now. Those years have been an education in the uses and the liberating power of heroic space—the main room, occupying roughly a third of the house, rises a full three stories—but they began with a different sort of education, in the ways of unanticipated fame. As Lynn remembers, "twelve million people were watching our house being built. We could easily have used a policeman out front, with all the traffic, and in fact we later learned that the Concord police were handing out maps. A couple brought their seven-year-old to watch the house being built. It was his birthday present. I was recognized in Times Square by a *This Old House* fan. And even three years later, someone in a hotel in Atlanta said, 'Are you the Wickwires who built the barn?' "

The Wickwires who built the barn took some time to become the Wickwires who live in the barn—or at least feel like they do. "There was a process of claiming the house, a little at a time," Lynn says. "After the party that followed the filming of the last episode, we slept here for the first time. But even then, it didn't feel like our house. The contractors and subcontractors were giving it up to us, and it still felt as if it was their place. That twelve million people had been watching them build it magnified their involvement and their sense of proprietorship. The house had truly become a piece of each of them."

LEFT: Massive yet elegant, the wooden tracery of Tedd Benson's post-and-beam frame combined with the clean steel lines of the central staircase creates an abstract mosaic of light and space. ABOVE: A sliding wood door serves as homage to centuries of barn design.

Once that transfer of psychological ownership took place, the Wickwires began to discover the ways in which the house transformed their daily routine. Listening to a CD of *La Boheme* was a pleasant enough experience before, but having the voices of Mimi and Rodolfo rise 32 feet to the ceiling was "awesome." The barn's acoustics are so good, Barbara says, they are thinking of hosting a chamber music concert or perhaps even a Gilbert and Sullivan operetta. On a less grand scale, Lynn says, the main room is simply a wonderful place to "sit on a Sunday morning, when I'm the only one up, to watch the play of light on the timbers and drink coffee while I read the *Times*."

The barn has also brought the force of its personality to bear on the matter of decorating. "The scale of this house is so big that you have to do things on an equally large scale," Barbara points out. "You can't buy a small bouquet of flowers; you have to set out a big, bold arrangement. It's the same with furniture and accessories," she says, pointing to the clean lines of the massive French pine furniture and an elegantly simple glass platter half a yard in diameter. The hearth of the great room's fireplace is a jutting slab of granite, raised above the floor, with no mantelpiece fussiness about it. The dining table, handmade by a friend, a former head of the planetary science department at MIT, is spare of detail but baronial in size.

The sole exception to the barn's monumental scale is an intimate library, which doubles as a guest room and can be sectioned off from the dining area with a pair of sliding doors that *This Old House* master carpenter Norm Abram fashioned from timbers and siding salvaged from the original structure. Unlike the eggshell white walls of the great room, kitchen and upstairs bedrooms, the library walls are painted a warm brick red that further reduces the room's size.

It is a wonderful peculiarity of the Concord barn that although it never intimidates a lone individual or diminishes an intimate gathering, its bold proportions argue for a certain public profile. Over the six holiday seasons they have lived here, the Wickwires have taken to setting up Christmas trees 16 to 18 feet high, trees so tall that their garlands of little white lights have to be festooned in place with a garden rake at the end of a pole. The tree stands before the tall windows of the front entryway, with a four-foot wreath in the window above, so that the entire display is visible to passing

ABOVE: With pike poles and muscle, students of post-and-beam construction raise the frame, just as neighbors must have helped haul up the original. OPPOSITE: The view from the view. It was the prospect of looking out at this pond that got the Wickwires thinking about living in their barn.

travelers. "It's a way of sharing the house, the tree, the great space," Lynn says.

A more direct way of sharing, of course, is to fill the barn with people. "The traffic circulation in the house is terrific," says Barbara. "You could easily handle a hundred people here." A visitor looks around what is after all not a cavernous house, hardly a mansion, and tries to visualize the ebb and flow of such a crowd around and onto the open central staircase, out of the big, airy kitchen and into the great room. It seems not at all implausible—and Lynn offers that at least 90 members of his running club have gathered here.

In Concord these days, as in many a suburban town, there are more and more people and a lessening distance between homestead walls. The orientation of interior space and the landscaping that was designed to help isolate the barn and its inhabitants has worked well, the Wickwires feel, although both are sorry to see an older, more open Concord slip away. The change has come even in the seven years since they built the barn, and certainly over the nearly two decades since they moved into their old Victorian. Lynn has long been able to run five or six miles through the woods that ramble just across the road, but he sees the end of that particular trail coming with the subdivision of the wooded acres and the growing thicket of fences and Keep Out signs that subvert an older ethic of sharing open land. But aesthetically, at least, the old days can be kept alive. "We feel we've helped to keep the rural quality of the road by doing this project," Lynn says. "The barn represents what Concord used to be." It's a hard point to argue in a neighborhood where newer house styles run the gamut from split-level ranch to neo-Jacobean.

The Wickwires lived in their next-door Victorian for 13 years, eyeing the old barn for most of that time, and anyone who holds onto a dream for that long seems bound to face the gaps between anticipation and reality when it finally comes true. But in this case, the surprise seems to have been no surprises—or at least very few.

There were, of course, the small discoveries stemming from the choices they made in design and materials. Barbara has found that if you want to stay on your feet and cook for a long stretch in a kitchen with a tile floor, "you'd better be wearing sneakers." Lynn wishes they had put sound insulation in the floors, because noise from a television on the third floor has a way of insinuating itself downward to the lowest levels of the house. The motors on the automatically controlled skylights have been replaced, the only equipment failure to date.

"The house has lived up to our expectations and beyond," Barbara asserts. "It's a special place, and we'd do it again in a flash. Because of it I'll always have high expectations of where I live—and I can never again have short ceilings."

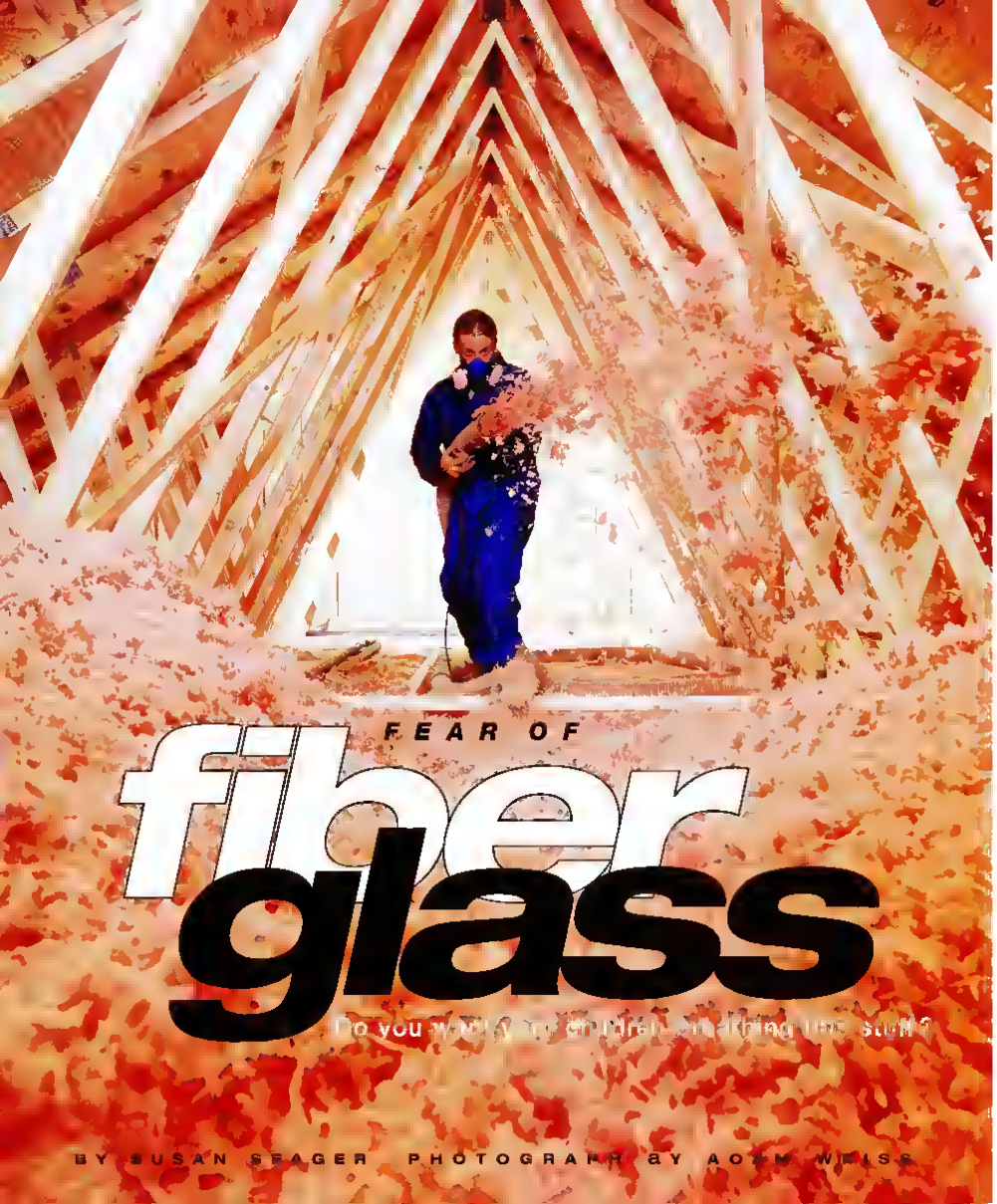
"I was tired of old houses," adds Lynn. "All the things you couldn't fix—windows, leaks, bats in the attic—so it's nice to have a place where everything works. But beyond that"—he gestures toward the bold, solid tracery of the post-and-beam frame and the honey-colored crossbeam with MCMLXXXIX carved into it as if in challenge to the ages—"this is a work of art. It's a space that has expanded us and allowed us to fill it." And, of course, there are the views of the pond, uninterrupted now, with no barn standing in the way.

Pipe dreams sometimes have a way of coming true. And this fall,* This Old House *viewers can watch the Wickwires' dream take shape all over again. All the Concord barn episodes will be rebroadcast on commercial television, a first for a PBS series.

For station listings, turn to page 133

PHOTOGRAPH THIS PAGE © WGBH EDUCATIONAL FOUNDATION

See Directory on page 133, for details and sources



FEAR OF fiber glass

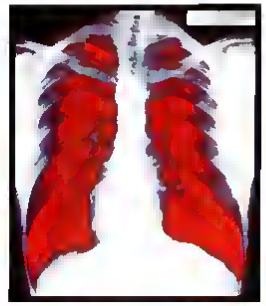
Do you worry your children breathing this stuff?

BY SUSAN SEAGER PHOTOGRAPH BY AOTM WEISS

With fall fast approaching and last winter's worst days locked in memory, homeowners are crowding do-it-yourself depots. Like busy squirrels cozying their nests, they push carts stacked high with roll after roll of fluffy fiberglass toward the checkout counters, apparently oblivious to a clearly visible alert printed on each batt and roll. "WARNING: Contains fiberglass wool. Possible cancer hazard."

Brenda Gregoricus didn't notice. Buying batts this summer for a new cathedral ceiling in her home in Saco, Maine, she didn't flinch when the warning was pointed out. "Nor at all. I just assume the wallboard is going to cover it."

A few miles away, in South Portland, John Lemery, manager of Builders Insulation of Maine, balanced on joists as he watched his crewmen pump hundreds of cubic feet of cottony fiberglass clumps into an attic. Lemery, who's been working with insulation for 23 years, scoffed at the warning, saying his lungs are fine. He has never heard a complaint from anyone who has worked for him, either. "So far, nobody has proved to me that fiberglass is dangerous like asbestos," he said, acknowledging that he gets most of his information from manufacturers. "In my mind, it hasn't been proven that fiberglass insulation is a carcinogen."



BARRY BLUESTEIN INTERNATIONAL

Indeed, manufacturers, with a $2 billion industry at stake, have endeavored to dismiss the idea ever since the U.S. Occupational Safety and Health Administration mandated the warnings five years ago. The industry has labeled the government's cautions an unnecessary scare, proclaimed many studies flawed, sponsored its own research that it claims shows fiberglass is safe, insisted human bodies dissolve inhaled fibers harmlessly, announced that no animal in any scientific study has ever contracted cancer from inhaling fiberglass, bristled at comparisons of fiberglass with asbestos and generally attacked those who ask tough questions. Jim Worden, a spokesman for Owens-Corning Fiberglas Corp., the largest manufacturer, criticized this magazine for examining how the scientific studies have been conducted and analyzed. "The level of detail [of your questions] is of more academic interest than would interest the readers of the publication," he said.

Despite industry efforts to reassure homeowners and installers, the issue refuses to go away. Two years ago, the U.S. Department of Health and Human Services included fiberglass insulation on its list of products "reasonably anticipated" to cause cancer in humans. And OSHA, the Consumer Product Safety Commission and the Environmental Protection Agency are all studying whether further action is needed. In particular, they are closely monitoring an industry-sponsored study, begun last year in a Swiss lab, that was not expected to produce complete results until 1995. In April, only a quarter of the way into the experiments, researchers were surprised to find that something had gone wrong with one of the animal subjects—so wrong that it may undermine one of the industry's primary claims about the safety of fiberglass.

SOMETIMES IT SEEMS AS IF HOMES ARE SO full of dangers that fiberglass stuffed inside walls and piled above ceilings is the least of the possible problems. There is lead in paint and pipes, asbestos in old insulation, radon in basements and formaldehyde in carpets. If fiberglass fibers stayed put once installed, homeowners might have little to be concerned about. But the fibers often don't sit undisturbed. Family members tramp in and out of fiberglass-filled attics with holiday decorations and boxes of clothes. Houses are remodeled, exposing old fiberglass. And in the 65 percent of American homes with forced air heating systems, ducts surrounded by fiberglass can leak, allowing small bits to be drawn into the returns, sucked through the filter and blown into the house. In 1990, leaking ducts were found in 85 percent of the homes tested by the Florida Solar Energy Center, a state-run agency. James Cummings, a senior research analyst, said other studies indicate the problem may be worse elsewhere. No one really knows how great the danger may be to the children and adults who live in those homes every day, because virtually all health studies have focused on professional installers and workers in fiberglass factories.

Until a few decades ago, no one needed to worry about fiberglass. Although it was first manufactured in the United States in 1897, homemade insulation such as corn cobs, newspapers,

bricks and even ostrich feathers remained popular until the 1930s.

To make fiberglass insulation, manufacturers melt sand, recycled glass and small amounts of soda ash, borate, dolomite and limestone. Then they spin the superheated goo into thin, smooth fibers, much as a carny whirls melted sugar into cotton candy at the county fair. Although fiberglass strands look soft, they are sharp. Skin exposed to the material itches because the fiber ends poke like tiny needles.

Scientists began wondering about the safety of fiberglass because of its similarity to asbestos—a group of inert, natural silicate minerals commonly used in homes and factories as insulation. It wasn't widely known until many years later, but scientists discovered in the 1930s that asbestos can cause a fatal scarring of the lung tissue called asbestosis, as well as cancer of the lungs, larynx and digestive tract. Asbestos can also cause mesothelioma, a rare cancer of the chest lining. Shipbuilders, automobile mechanics, construction workers, railroad workers, even wives whose only exposure to asbestos was washing their husbands' clothes became fatally ill.

It took decades of scientific studies, disputed by the asbestos industry at every turn, until the World Health Organization and the U.S. Department of Health and Human Services classified asbestos as a known carcinogen. Scientists still aren't sure why asbestos causes cancer, but they believe three factors are involved: Its fibers are so thin they can penetrate into the lower lung; they are so long that the lungs' tiny scavenger cells cannot surround them and they are so durable that they irritate tissues for decades. "There's every reason to believe that it's the fiber shape that makes the poison," said Will Forest, a toxicologist for California's Department of Health Services.

Aware that fiberglass also consists of long, thin, silicate fibers, researchers set out in the 1970s to study whether it might have similar deleterious effects. An industry-sponsored study of 17,000 U.S. workers, published in 1987, found that those who worked with fiberglass died from lung cancer 16 percent more often than the national average and 9 percent more often than local averages. A 1984 study coordinated by the International Agency for Research on Cancer that tracked 25,000 factory workers in seven European countries found lung cancers among fiberglass workers were 39 percent higher than national averages and 11 percent above local averages. An industry-sponsored 1987 study of 2,600 Canadian fiberglass workers found lung cancers at twice the national rate.

Many scientists say the findings from these studies are difficult to interpret because a significant number of the workers also smoked or were exposed to asbestos on the job. And the results are certainly nothing like the 500 percent increase in cancers seen among asbestos workers, although asbestos workers generally were exposed to far more fibers. Fiberglass manufacturers say the increases are statistically insignificant when compared with local rates, using national rates for comparison is invalid, they say, because too many other variables are present. "Our industry feels as a result of the studies involving workers and worker inhalation studies, covering 50 years, the evidence shows there is not an association between exposure to fiberglass and cancer and other illnesses," said Catherine L. Imus, director of communications for the North American Insulation Manufacturers Association, which represents fiberglass makers.

Testing fiberglass on animals has been problematic because most rodents breathe only through their noses, which do a good job of screening out dust and toxins. In the late 1970s and early '80s, researchers from the World Health Organization and the National Cancer Institute decided to bypass the noses of rats and inject or surgically implant fibers into their lungs, chest cavities or tracheas. In some of their tests, 71 percent of the rats developed malignant tumors; in other tests, 27 percent developed mesothelioma, the cancer that until then had been associated with asbestos.

The fiberglass industry said injection of fiberglass does not accurately mimic natural inhalation, in which the nose, airways and lungs can catch fibers before they do harm. In 1981, 1984, 1987 and 1993, the industry-sponsored studies conducted under more natural conditions. In these tests, rats, hamsters, guinea pigs and baboons inhaled fiberglass through their noses. The animals remained virtually free of cancer. Critics noted that animals inhaling asbestos in control groups were also virtually free of cancer, yet the disease would have occurred had fibers been inhaled by humans. Some scientists saw this as proof that the animals' breathing cannot be compared with that of humans.

The debate over the link between fiberglass and cancer came to a head in 1993, when the Department of Health and Human Services decided to list it as a possible carcinogen in its "Seventh Annual Report on Carcinogens." The North American Insulation Manufacturers Association challenged the listing, saying the department had failed to consider an industry study that year which had found no significant increase in cancer among rats that inhaled fiberglass.

After a year of additional review, Peter Infante, a top OSHA official, and his colleague, OSHA toxicologist Loretta D. Schuman, said they were convinced that all the scientific studies, taken together, indicate fiberglass is as strong a cancer-causing agent as asbestos. "On a fiber per fiber basis, glass fibers may be as potent or even more potent than asbestos," Infante and Schuman wrote with two other scientists in a 1994 article for the *American Journal of Industrial Medicine*.

The article sparked a reaction from manufacturers and some scientists. Worden of Owens-Corning derided Infante as someone who "trained as a dentist." True, but he further trained as an epidemiologist and has published articles in the *Lancet*, the prestigious British medical journal.

The industry's newest defense of its product is that the fibers dissolve relatively quickly in the human body. An Owens Corning study released this year says fiberglass dissolved within 50 days in laboratory-created fluids intended to mimic those found in the human lung. Most researchers agree that the body can dissolve fiberglass more quickly than it can absorb asbestos, which has been shown to remain in lungs as long as 68 years, but they say the process is complicated and cannot be perfectly imitated in test tubes.

Dina Melamed, a 57-year-old former medical technician, showed a jury photographs to bolster her physician's conclusion that she suffers permanent, asthma-like breathing problems because she inhaled fiberglass. BELOW: A depression in her attic insulation where fibers were sucked into the heating and air-conditioning system. ABOVE: A filter that caught some of the fibers. "The rest are in me," Melamed said. The jury ordered builders of her home in Pleasant Hill, California to pay her $59,850.

HOMEOWNERS, OF COURSE, WONDER what all this means. Even critics of fiberglass say the material can be safe if installed correctly and left where there is little or no human activity, such as under boards in a finished attic, above a crawlspace or inside a wall. Air ducts should be checked carefully. If leaks are found, the best remedy is to use caulk designed to seal ductwork. Taped connections aren't permanent.

Nobody recommends that homeowners rip out existing fiberglass insulation. "That's worse—then they will be exposed," said Anjanette DeCarlo. She spent eight months reviewing insulation safety for the National Resources Defense Council, an environmental advocacy group, and concluded that cellulose, cotton or plastic foam board are safer than fiberglass and often perform better.

If fiberglass must be removed, perhaps for remodeling, the rest of the house should be sealed off with taped plastic sheeting. Workers should wear protective clothing, goggles and a respirator. Residents should stay away during the removal and make sure the area is clean before anyone without a respirator returns. Renting a special vacuum cleaner equipped with a high-efficiency filter also helps. "We have limited data on fibers released during removal," said Chuck Axten, staff vice president for health, safety and environmental affairs at the North American Insulation Manufacturers Association. "So when removing insulation, it does make sense to limit exposure. You don't want the fibers to get on clothes, bath towels—if household goods get contaminated, you can get the whole house contaminated." Even though the long-term health consequences aren't known, he said, the fibers would definitely make people in the house itch.

If fiberglass is added to a house, those who install it should wear a respirator. Disposable filters with two elastic bands provide a far better seal than masks with a single band. Rubberized half- and full-face masks are best.

Some fiberglass batts and rolls come wrapped in plastic. Although this is sometimes called "encapsulating" fiberglass, the term gives the thin plastic too much credit. The wrapping is perforated to allow moisture to pass through, and it tears easily.

Loose fiberglass blown into attics may be the most dangerous form of the insulation because the fibers are not secured to a paper backing or wrapped in plastic. Peter S.J. Lees, a researcher at Johns Hopkins University who tracked 99 professional installers, found that when batts were installed, few fibers became airborne, and only half of those were small enough to become lodged deep in the lungs. But when loose fiberglass without a binder was installed, "essentially everything was respirable." The concentration was 50 times greater, about eight fibers per cubic centimeter of air.

Although installers, generally professionals, face the greatest hazard, people who remodel or work amid blown-in fiberglass are also putting themselves in danger, said David Goldsmith, a senior scientist at the California Public Health Foundation, a nonprofit organization affiliated with the California Department of Health Services. Goldsmith presented written testimony to the

PHOTOGRAPHS COURTESY DINA MELAMED

OWENS-CORNING

California legislature in 1992 in favor of a proposed ban on loose-fill fiberglass.

There is also concern about a little publicized use of fiberglass to make or line ducts for heating and air-conditioning systems. Although the fiberglass is tightly compressed and bonded with resin, some experts worry that the material may fray from the constant force of the air flow or because of improper installation or cleaning. At least two companies recently began coating the fiberglass in their duct board. "The principal purpose of adding the extra protection is for cleaning," said Tom Newton, manager of communications for Schuller International, one of the manufacturers. "As a secondary, it alleviates concerns, although they are not really valid concerns, that fiberglass may blow from the surface."

fiberglass

TRADITIONAL BATT

The most common insulation, available everywhere. Doesn't settle or disintegrate with age. Fire-resistant. Not a vapor barrier. Doesn't seal well. Inexpensive. . . -value per inch: 3.1 to 4.3.

BATT WITH MIRAFLEX FIBER

Features are similar to regular fiberglass, with these advantages: It's virtually itch-free, has none of the formaldehyde traditional batts use as binder and can be compressed more in the package. R-value per inch: 2.9

Last year, Owens-Corning introduced a new fiberglass that looks and feels like cotton. Called Miraflex, it consists of two glass strands spun together to produce fibers that are springier than regular fiberglass. The fibers can be compressed tightly, allowing stores to display more rolls and customers to haul more on each trip.

Owens Corning decided not to place the cancer warning label on Miraflex. A year ago, company spokesman Tom Merker told *This Old House* magazine it was because the fibers are so different that Miraflex could not break into a size that could be inhaled. Worden now says that claim was wrong. In size and durability, the fibers are no different from those of ordinary fiberglass, he said. The company did not label Miraflex because "exposures are so low that there is no cause for concern." Worden said the company also believes no warning is needed on regular fiberglass insulation, which it began placarding with warnings about cancer in animals four years before OSHA required a warning about cancer in humans. At the time it seemed the expedient thing to do, he said. "People think they're wearing this dust mask to protect against cancer. We don't think that's true. We believe the mask protects against irritation."

OSHA rules say companies are responsible for ensuring the safety of their own products. The agency will study a product only if it gets a formal complaint. It studied regular fiberglass because of a petition filed by Victims of Fiberglass, a group partially funded by a cellulose insulation company. And if someone petitions to have Miraflex examined, OSHA will study that product too, said John Martonik, the agency's deputy director of health standards.

Even if the product releases only small amounts of respirable fiberglass, it would need the warning, Martonik said. "It doesn't really matter that there are fewer fibers. The fact is that if the substance releases hazardous materials, then it's covered by the standard." Were Owens Corning to be found in error, it might be fined. But a more likely result would simply be an order to affix a warning.

Meanwhile, studies underway in the Swiss lab continue. Because of the debate about whether rats are the best test subject, the researchers are using hamsters, which have more sensitive lungs. Over 18 months, the animals will be subjected to multiple doses of fiberglass. Some will breathe ordinary fiberglass, others a finer type used in industrial vacuums and a variety of specialty products.

A few months ago, researchers performed autopsies on animals that had died from an intestinal disease that swept through the lab. No hamster exposed to insulation-size fiberglass had cancer. But one exposed to the finer fibers had contracted mesothelioma, rarely seen except with exposure to asbestos. "The fact that it came back with a mesothelioma so early is a concern to the EPA," said Vanessa Vu, deputy director of the agency's Health and Environmental Review Division. She said it is too early to say how the agency will respond.

But one thing is certain—the fiberglass industry says it will rephrase its assurances about fiberglass. Soon after it learned about the hamster autopsy, the North American Insulation Manufacturers Association gave manufacturers a "health and safety update" to pass on to customers and government agencies. The new study, says the update, "indicated that exposure to a very large dose of special-purpose fibers may induce significant disease in animals." Axten, the industry's chief spokesman on health issues, said mesothelioma in a single animal is considered significant because the tumor was "very pronounced and very invasive" and because it showed up so early on in the study.

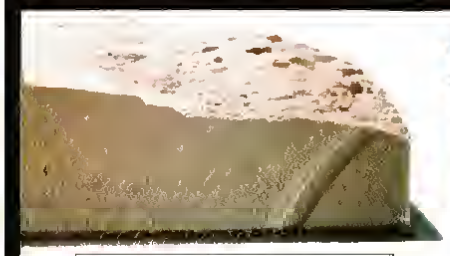
Since then, 45 more hamsters have died, including 12 exposed to the finer fibers. None had mesothelioma. "We don't know how to put it in context," Axten said.

In early September, researchers plan to kill and perform autopsies on a randomly selected group of hamsters. Axten said the industry will meet with EPA and OSHA to review the results, then make them public.

See Directory, on page 123, for details and sources.

the alternatives

PHOTOGRAPHS BY DARRIN HADDAD

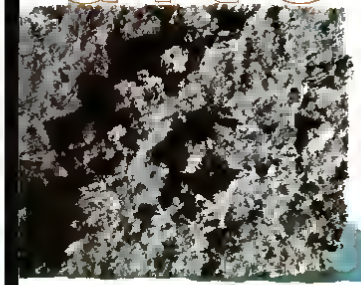


POLYURETHANE FOAM

A sprayed-in plastic for walls, attics and roofs. Blowing agent is an ozone-depleting hydrofluorocarbon. Almost impermeable to moisture and air movement. Seals gaps. Can't be used in existing walls unless drywall or plaster is removed. Expensive. R-value per inch: 6.7 to 7.3.

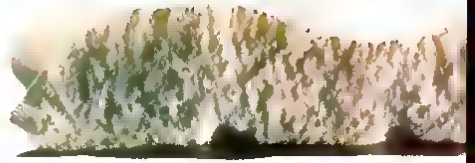
COTTON

Shredded scraps of blue denim, plus polyester binder and an undisclosed flame retardant that the manufacturer says is used in children's pajamas. Comes in batts and loose fibers for walls, attics, roofs, basements. New, so some installers are unfamiliar with it. Not approved by some building codes. Absorbs more moisture than fiber glass but less than cellulose. R-value per inch: 3.1 to 3.3.



CELLULOSE

Made of mostly recycled shredded paper plus boric acid or other fire retardant. Sprayed dry, dampened with acrylic binder or wet into attics or walls. Unless densely packed, can settle if sprayed dry. Extremely dusty during installation. While blown in fiberglass' r-value has been shown to decrease by 35-50% when temperature outside is 20-76 degrees colder than inside, cellulose's r value is unaffected. R-value per inch: 3.7 to 3.8.



POLYICYNENE FOAM

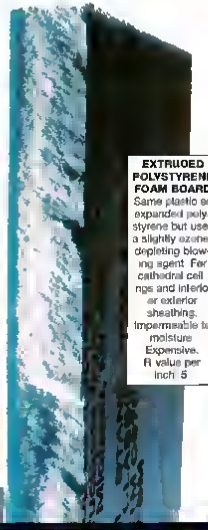
Made of modified urethane, a plastic similar to that in mattress foams. Sprayed into walls and attics with water as blowing agent. Stabilizes wobbly plaster. Seals gaps. Almost impermeable to moisture and air. Expensive. R-value per inch: 3.6.

CEMENTITIOUS FOAM

Made of magnesium compounds extracted from seawater. Sprayed into wall cavities. Can crumble; needs surface protection. Not sold for earthquake country. Expensive. R-value per inch: 3.9.

EXPANDED POLYSTYRENE FOAM BOARD

Similar to disposable coffee cups. Made of petroleum by-product, up to half can be recycled polystyrene. Blowing agent pentane doesn't deplete ozone. Good for narrow or hard-to-reach places, roofing or prefabricated wall panels. Impermeable to moisture. R-value per inch: 3.6 to 4.2.



EXTRUDED POLYSTYRENE FOAM BOARD

Same plastic as expanded polystyrene but uses a slightly ozone-depleting blowing agent. For cathedral ceilings and interior or exterior sheathing. Impermeable to moisture. Expensive. R-value per inch: 5.

POLYISOCYANURATE FOAM BOARD

Rigid plastic foam for walls and roofs. Blowing agent is the same as that used in extruded polystyrene. Moisture resistant. R-value per inch: 6.8 to 7.

DARRIN HADDAD

TILE and TOIL

BY WENDY TALARICO PHOTOGRAPHS BY CRAIG CUTLER

This ornamental starter piece is used at one end of a roof's hip, a ridge that descends from the main section of the roof. Such tiles, which look as good on a coffee table as they do on a house, are laboriously cast in carved wooden molds. The cost for this piece about $100

To those who appraise it for architectural style, David and Sandy Reif's tile roof is both appropriate and attractive. But to roofer Andrew Taurosa, it's a dog—steeper than a double-diamond ski slope, more slippery than an ice patch and covered with heavy, bulky fired-clay shingles. This sort of work is never easy.

"It's either broiling hot or freezing cold up there," Taurosa says, eyeing the pitch like a climber sizing up a mountain face. "Every morning I wake up, step outside and search the sky. That tells me what kind of day I'll have."

Clay tiles aren't waterproof. They work by protecting an underlying waterproof membrane from damaging ultraviolet light

This day the sun is warm, the breeze is cool and the humidity level is low—perfect roofing weather. Taurosa walks catlike across the tiles, stepping close to the butt ends of each row, where the shingles are strongest. Although he curses the slope, he seems utterly confident.

Taurosa learned his trade young, working the slate and tile church steeples of Newark, New Jersey. He now finds walking at threatening angles normal. "That's another hazard of the roofing trade," he says, flicking his third cigarette in 30

An old clay-tile roof is a work of art, and worth fixing at any price

Clay tiles weigh as much as 9 pounds each. That adds up fast when there's a stack that needs to be hoisted onto a shoulder and carried all the way up a tall ladder.

minutes onto the ground far below. "After being up here all day, you forget how to walk on solid ground."

Located outside Philadelphia, the Reifs' 82-year-old house still sports its original tile, a 7-by 14 inch wedge that tapers from a thickness of 1 inch at the butt end to about ⅝ of an inch at the fastening end. Last winter, a branch from an old oak crashed down on the roof, breaking several sections of tile. The Reifs had to decide whether to put on a new roof or replace the broken pieces. After consulting with the local historical society, they decided to keep the tile.

Clay tile can hold its own against centuries of hot sun, high winds, torrential rains and countless freeze-thaw cycles. Impervious to salt and pollution, it won't rot, split or curl. Bugs won't eat it, few plants will grow on it and sparks rest impassively on its surface until they burn out. A tile roof will outlast the wood deck it rests on and the nails that hold it in place. Centuries old palaces and monasteries crouch secure and dry under their original tiles. By contrast, a good composition shingle roof will, with luck, last 30 years.

There are only two problems with roof tiles: They're heavy and they break. A square (roofer jargon for a 10-by-10-foot section) weighs about 1,000 pounds, although a properly engineered house can shoulder the load. Tiles also fracture like teacups under a volley of golf-ball-size hail, a falling branch or an inexperienced roofer's feet. When broken ones need to be replaced, it means a search for salvage pieces—difficult if the tile is old and no longer manufactured. Many roofers and homeowners turn to tile brokers. There are only a handful of them, but they are as passionate about old tiles as paleontologists are about bones.

The Reifs enlisted Keo McGee, a tile broker in Lounsburg, North Carolina. Wedge tiles, like many older designs, were made in small quantities by regional factories. Finding replacements required some sleuthing. After several months, McGee located a match at a salvage yard in Pennsylvania. The yard owner was ready to toss the tiles, so the Reifs acted quickly. When they arrived, they found the tiles in a rubbled heap. The yard owner had used a front loader to move them. Only 1,000 of the 3,000 piece cache were usable. At a price of $3.75 each, the yard owner lost close to $7,500. Says McGee, "I could have sold all 3,000 and more."

Much of McGee's business comes from people who are building new homes but want old tile roofs. Weathered tile has a patina that only comes with age, like that of an antique chest or an old wood floor. Tiles come in dozens of shapes and sizes, and each one attaches to the roof a little differently. Some are simply laid in place and rely on their own weight to hold them down, while others use interlocking tongue-and-groove systems. Different types of tiles are used on different parts of a roof. For example, rake or edge tiles wrap over gable ends, ridge tiles line the peak and transition pieces handle the switch from one pitch or ridge to another.

The Reifs' tiles are positioned with nubs or lugs that project from the underside of each piece to lock it in place over the one beneath. But the holding power comes from copper nails hammered into the wood roof deck through two nail holes at the top of each tile. The holes are covered by the course of tile above. The nails sit slightly proud of the surface, giving the tile some room to move and chatter. Tiles ripple slightly in the wind and expand and contract with the drastic temperature changes typical on a roof. If they couldn't shift a bit, they would snap.

Fixing a tile roof is a slow, painstaking process, and labor is correspondingly pricey—10 times more than laying a composition shingle roof. It's impossible to simply nail a new tile in place without removing all the tiles around it. "You either have to rip off the whole roof and start over, a waste unless the damage is significant, or you have to find a way to wedge the new piece in place," Taurosa says.

Shunning the copper tabs available from tile companies, Taurosa makes his own fasteners to hold replacement tiles in place. The tabs, he says, are visible from the ground and detract from the look of the roof. They also deform under pressure from snow and ice, a significant concern where the Reifs live. Taurosa uses copper wire that he knots onto the tile and loops around nails driven into the roof deck.

"There's no real right or wrong way to replace a tile," he says. "Every case is a little different, depending on the type of tile, the shape of the roof and weather conditions. My method is time-consuming, but it works. I won't be back on this roof anytime soon."

working on a slope of clay

few roofers look forward to this kind of repair

PHOTOGRAPHS BY BARRY DAVID MARCUS

LEFT: Taurosa removes broken tiles using a slater's bar and a hammer. The bar has a hook at the tip that works nails out of the deck, allowing the tile to slide free. RIGHT: Once he has cleared out the broken pieces and swept the roof clean, Taurosa returns to the ground and, using a masonry bit, drills holes in the butt ends of the replacement tiles. These are carried up to the roof and stacked neatly.

After driving a 2½-inch copper nail into the deck an inch below the adjacent course, Taurosa threads copper wire through the hole in a replacement tile. While lifting the surrounding tiles, he slides the replacement in place, making sure the lugs catch the surface of the tile below. He then knots the wire using a pair of pliers.

There's a tile designed for every purpose, but the tile broker who located the pieces to match the Reifs' roof couldn't find rake tiles. Taurosa made them himself, using mortar tinted terra-cotta red to create an end return on a piece of field tile. He used a diamond-tooth saw and nippers to trim the tiles.

shards of the past

PHOTOGRAPH BY SPENCER JONES

Made from pulverized clay mixed with water, tile is shaped by pressing it into a mold or feeding it through an extruder, which produces a ribbon of molded clay that's then cut into pieces. The pieces are fired in a kiln that can reach temperatures of 2,400 degrees Fahrenheit. The higher the kiln temperature, the harder and more durable the tile. Soft, porous tiles are fine for hot, dry regions but would disintegrate in northern freeze-thaw climates.

Tiles are either curved (pantiles) or flat, resembling shingles. Different clays yield different colors, depending on the presence of certain elements. Iron oxide, for example, produces the characteristic terra-cotta red, manganese produces black or dark purple. Glazes may be sprayed over tiles to create a glossy effect.

A. 1890s unglazed Gothic tile, natural-clay red. $1,250 per 10-by-10-foot square. **B.** 1890s natural-clay red flat tile, $1,100 per square. **C.** Early 1900s Spanish tile with wavy profile, $225 per square. **D.** Early 1900s fluted French tile, highly glazed fox red, $500 per square. **E.** 1920s Spanish tile with Brookville green glaze and antimony spots, $650 per square. **F.** Late 1890s Conosera unglazed tile, $350 per square. **G.** 1890s French lavender glass flat tile used for skylights, $100 per tile. **H.** Early 1900s French Gothic fluted tile with Brookville green glaze, $850 per square. **I.** 1920s Colonial textured shingle (coated with lichen), $550 per square. **J.** 1930s Dresden tile with wire-scored or combed surface, $350 per square.

See Directory, on page 123, for details and sources.

THE ECONOMICS

New clay tile starts at about $300 per square, labor not included. That's slightly less than copper ($400 per square) and about the same as slate. Cedar shingles and steel roofing cost about $150 per square. Composition shingles are the most affordable, about $30 per square for a 25-year roof. At around $800 per square, salvaged tiles are expensive but still less costly than having new tiles custom made to match an old design. Manufacturers charge setup fees for one-of-a-kind tiles that range from $300 to $3,000, depending on intricacy. Labor costs vary according to the pitch of the roof and the size of the job, but laying tile, slate and cedar is slow, painstaking and pricey. Installing copper or metal costs about a third as much. Composition shingles can be installed by homeowners. Life expectancy for each type of roofing varies according to climate, the shape of the roof and the quality of the materials. On average, warranties cover cedar for 20 years, composition shingles for up to 30 years, steel for 30 years and slate, tile and copper for 50 years.

PHOTOGRAPH COURTESY THE TILE MAN, INC.

an island preserved

The island of Nantucket was never intended to be the genteel and charming resort evoked on this issue's poster (see pullout at right). It should not have been the sort of place where a dilapidated, 109 year-old Victorian would be remade by fine craftsmen for all of America to see on national television. If things had gone as planned, Nantucket wouldn't even have had the romance of its proud seafaring history—the first European settlers on the island simply wanted to farm.

But the soil was so poor, they turned to raising sheep instead. When the sheep ate all the vegetation, they took a hint from the Indians who preceded them and headed out to sea in small boats. As the white man's diseases decimated the Indians, Nantucketers thrived, building larger vessels and venturing farther out to sea in search of whales. Quakers became dominant, their modest philosophy ruling island life. They built simple houses and considered even headstones in cemeteries frivolous. A woman was read out of Quaker meeting for placing a red rose on her husband's grave.

But no-nonsense Quaker enterprise paid dividends. Whaling ships ranged into the South Atlantic off Brazil, then around Cape Horn to the Pacific. Melville wrote in *Moby Dick*: "Two thirds of this terraqueous globe are the Nantucketer's. For the sea is his; he owns it."

As Nantucket flourished, the waterfront became crowded with chandleries, sail lofts and whale-oil refineries. By 1840, the year-round population was 9,712, greater than it is today. The Quakers' hold loosened. Pianos and violins arrived. Houses grew larger. Nantucketers saw themselves as extraordinary. They spoke of the mainland, 30 miles away, as another place entirely, as "America."

Then the Great Fire of 1846 destroyed more than 300 buildings, and investment capital fled to New Bedford. Whaling was crippled. Seamen jumped ship in San Francisco and took their chances in the Gold Rush. World-roving sea captains reverted to farming.

In 1854, the introduction of kerosene shut the hatch on whaling. Half the population left. Those who stayed fished, farmed and cultivated cranberries, and some paid their taxes by working for the town. While the rest of the country prospered and built homes in fashionable styles, Nantucketers were lucky to maintain their modest early houses.

PULL OUT POSTER HERE

It was decades before the tide turned again, but when it did, Nantucket was reborn as a resort. Now, summer visitors find on this tiny island something most of America has lost: a true sense of the nation's past.

—JACK MCCLINTOCK

Nantucket

THE HOUSES OF

48 SQUAR

A Whaler's Home

Like houses in other seafaring communities such as Key West, the typical Nantucket home was built by ships' carpenters, so the workmanship was fine, the joints tight and the rooms compact. Seamen were used to close quarters, and the spare building style conserved materials.

Number 11 Milk Street is a handsome example. It has two stories with an attic and a pitched roof shingled with western red cedar. The roof has no dormers or overhang to

E MILES OF Preservation

sconset

The one-room, sand-floored shacks of Siasconset, on a bluff seven miles from Nantucket Town, provided temporary shelter for cod fishermen in the 1700s and 1800s. Later floored and expanded with lean-tos, Sconset "stages" became summer homes for actors and writers. A street was named Broadway, and Sconset became what it is today: "an elegant, well-heeled little summer retreat," as one local puts it. The much-photographed carousel horse is at the Chanticleer Restaurant.

orange street

Orange Street was known as "Captain's Row" because so many whaling skippers built their houses here. Greek Revival entrances and other fancy embellishments were added to many in the prosperous 1830s. On the outside, most of these houses are models of Nantucket architectural propriety. Inside, many have been radically updated to accommodate modern living.

Preserved by the misfortunes of history and economic depression, hundreds of Nantucket houses—more than 800 dating from before the Civil War—represent most eras of American home design. There are English medieval, saltbox, Cape Cod, Colonial Revival, Greek Revival, Gothic Revival, Federal, Georgian, Victorian, bungalow, Craftsman, Stick and Shingle styles.

But the quintessential Nantucket house, built between 1760 and 1830, was based on the Quaker principles of "simplicity, directness, proportion, balance and truth of expression," as Everett Crosby, author of *95 Percent Perfect*, puts it. About 180 of these typical Nantucket houses remain. If they appear to huddle together, shoulder to shoulder, it is because they were intended to. These houses sheltered one another from the icy winds, and a neighbor was always nearby in case of emergency. The houses, like the neighbors, had much in common.

Although Quakers of the day condemned the style as a too-radical advance from the spartan saltbox, they soon

Perfect

BY JACK McCLINTOCK
PHOTOGRAPHS BY DAN BORRIS

This Old House

catch winter's icy wind. Post and beam construction is sheathed horizontally with wide planks covered with shingles. The first shingles were washboard size and made of white pine, nowadays they are more durable white cedar. Shingles typically are left to weather, so a wet house is charcoal gray, a dry one a lovely silver. Cornerboards seal out the wind. Traditionally, trim was cream, gray, yellow brown or dull red. Today it is commonly painted white.

The house is set close to the street and nearly fills the lot from side to side, especially after the addition of a shed-roofed kitchen annex—known locally as a wart—on one side. On either side of the front steps is a cap railed picket fence. An off center front door with glass transom creates the typical asymmetrical facade.

There is a massive central chimney with flues serving multiple fireplaces. Inside is the typical foursquare plan: stairs and a closet to one side of the entrance, a parlor to the other. Beyond the stairs is a workroom, and beyond the parlor, a sleeping chamber. Upstairs are three bedrooms

picket fen

The cap-railed picket fence, Nantucket architectural feat along the sidewalk from doo helps unify the streetscape. also made struggling from h during a blinding nor'easter

friendship

Quakers, also known as the Friends, set great store on n Their "friendship stairs' sym by offering equal welcome from either direction

NAME TAGS

In a neat merging of English and seafa ere frequently given names, which are those on ships. They range from the w Crazy Is next door to Cuckoos Nest. T Palace, Petrel's Rest, Seldom Inn, Goo Snuggery and Very Snug are all in a re

rose trellis

In both habit and color, rambling pink-petaled roses add the perfect grace note to Nantucket's modest, gray-shingled cottages. Warmed by the Gulf Stream, Nantucket's winter climate is closer to that of Washington, D.C., than to the rest of New England. In the breezy summers, trellises climb walls—and sometimes even roofs—all over the island. One century old cultivar, the Dorothy Perkins, is known locally as the Sconset rose

widow's walk

Accessible through a hatch in the roof, the widow's walk allowed householders to keep a lookout for fires, schools of fish, whales, storms and family members returning from sea. A whaling voyage could last two years or more. Many roof walks, as they are called locally with an almost Quaker-ish restraint, were removed when the whaling industry perished. The lumber was recycled in other buildings.

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jared coffin

Jared Coffin built the island's first brick house in 1834, but this isn't it. This is the one Mrs. Coffin insisted on moving to when she tired of the first. That house, Moor's End at 19 Elegant Street, was too far out in the country and too near a pig farm. This one on Broad Street was, however, another first: Nantucket's first three-story home. It is now an elegant in-town hotel. (Mrs. Coffin didn't like *it*, either, and eventually moved back to the mainland.)

embraced the practicality of a straightforward, two-story house, set right on the street and covered with clapboards or shingles. Before long, these houses were the 18th century Nantucket equivalent of the 1950s ranch. Today we admire them for grace, simplicity, lack of pretention and aptitude for the place they were born. They seem as nearly perfect now as they did 100 years ago.

"It's remarkable how they can accommodate evolving lifestyles so graciously," says Jock Gifford, an architectural designer and Nantucket native.

ring traditions, Nantucket houses
carved into quarterboards like
itty to the sentimental. Gone
here are Chez Cod, Buckingham
d Tidings and Amen. The Snug,
w And in Sconset: Ensconst.

shingle styles

The earliest Nantucket houses were covered simply with horizontal planks up to two feet wide, and then later with clapboards. Shingles, though they may seem older and more traditional, actually came later. Decorative shingle detailing like this arrived later still, in the Victorian era.

the oldest house

The Jethro Coffin house, built around 1686, is a good example of the original settlers' homes: steep-roofed, rectangular, two-story, low-ceilinged, just one room deep, with a plank door and tiny windows of diamond-shaped panes facing south to catch the sun. Adding onto the rear created a lean-to roof extension, called a catslide, and gave the house its characteristic saltbox shape. Only four of these so-called English houses remain.

Nantucket Island, at once an intimate small town and an international resort, lies at latitude 41, 17, 50 N and longitude 70, 6, 28 W. Frequently shrouded by fog, it is sometimes called "the little gray lady of the sea."

Nantucket lies 30 miles from Cape Cod—or about 26 nautical miles, which may be a more appropriate measure for 'the land far out to sea," as the Indians called it. When the Revolutionary War ended in 1781, Nantucket got word only months later—via London, England. The island lost 1,600 men during the Revolution, more than in all subsequent American wars combined.

About 6,800 people live here in 2,500 year-round dwellings. In summer, the population

The average value of a house sold last year by one local real estate agent, who says he's an average producer, was $750,000. The 14 brokers in his firm sold $47 million worth.

Steamboat Wharf has served visitors since 1818. By the 1950s, the wharves were a run-down industrial slum of oil tanks and lumberyards. Investors led by S&H Green Stamp heir Walter Beinecke Jr. rebuilt the area with shops and cottages resembling old scallop shacks. When visitors arrived, uniformed hotel porters would line up and chant the name of their hostelry as passengers disembarked. Today's ferryboats bring as many as 12,000 visitors a day.

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Nantu

ause of the Gulf Stream, the air temperature is about 10 degrees warmer in
ter than on the mainland, often referred to as "America" or "the continent."
summer, the island is about 10 degrees cooler than the mainland.

e the first lighthouses, lightships flashed their warnings offshore. Bored crewmen
ed the time weaving wood-bottomed rattan baskets to which, in the 1940s, wooden tops
scrimshaw ornamentation were added. Nantucket lightship baskets now sell as handbags
undreds of dollars, and age darkened antiques go for thousands.

A third of Nantucket's land is owned or protected by one or more of 10 conservation organizations.

cket

In summer, Nantucket's airport is the second busiest in New England, after Logan International in Boston.

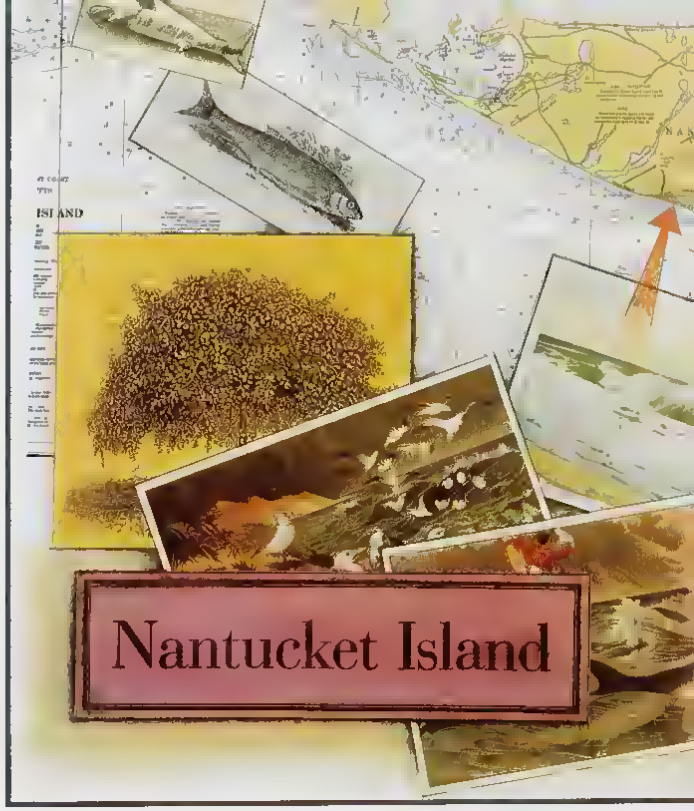
If the island averages 6 meters above sea level over 121,410,000 square meters of beach, and if a grain of sand measures 1 millimeter (or .039 inch), then there are 786,000,000,000,000,000 grains of sand on Nantucket, according to geologist Wes Tiffney, director of the University of Massachusetts Nantucket Field Station.

Cranberries have been cultivated commercially on

swells with an additional 40,000 who come for the season, plus thousands more day-trippers and weekenders.

Between 1800 and 1840 at the peak of the Nantucket whaling industry, 88 of its ships sailed the world's waters.

Moor is the term for central Nantucket's fragile heath landscape, comprising low grasses, berry bushes, scrub oaks, pines and heathers, all kept compact by wind, salt and cold. About one third of the nation's moorland is found here.



Nantucket occupies 47 8 square miles and measures about 5 by 12 miles at the farthest points of its boomerang shape

Bird-watchers clutching binoculars can be observ calling to one another m summer days. Nantucket regular stop for at leas two endangered shorebirc the piping plover and th least tern. To date, 354 species of birds have be spotted on the island.

The most dangerous predator on Nantucket is the deer tick, carrier of Lyme disease, a de Deer ticks are pinhead-size, much smaller than dog ticks, and live in higher concentrati

This O Hou

ILLUSTRATION B

Nantucket since 1857. The largest cranberry bog in the nation, at 260 acres, is here. The bogs, which look like dry rice paddies behind their dikes, are flooded in October to assist with the harvest. Beaten with a thresher, cranberries float to the surface to be gathered.

Nantucket has about 50 tennis courts (20 at private homes and 30 at clubs), 3 golf courses and 1 miniature golf course

Eleven hundred sixty-nine Nantucketers are Democrats, 975 are Republicans, 9 are Libertarians and 1 is a member of the Green Party; 2,669 are not registered.

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"In the summer, there's more fishermen than sand," a Nantucketer says. They surf-fish for striped bass in May, bluefish in June and bonito in August

Benjamin Franklin's mother, Abiah Folger, was born on Nantucket. The *Beaver* and the *Dartmouth*, two ships involved in the Boston Tea Party, hailed from Nantucket. Rowland Hussey Macy, a Nantucketer, founded the R.H. Macy department store in New York.

bilitating malady with no known vaccine or cure.
ons here than on the mainland.

ise

PAUL DAVIS

KELLER & KELLER

This Old House

in the garden

Pickerelweed does so well in Russ Morash's koi pool he calls it a "pond thug" and must thin it constantly. Most gardeners face the opposite struggle—coaxing luxurious growth from spindly plants. In this issue Russ shares secrets gleaned from years of hardscrabble gardening on Nantucket, where thin soil, constant wind and ever-present salt challenge flora. For flower beds, he admires showy but undemanding **rugosa roses** (PAGE 114). And he celebrates an island tradition of making do with what's at hand by laying down a **shell drive** (PAGE 120).

rugged roses

Rugosas thrive on poor soil and neglect

Paint a picture of a beach along the New England coast, and chances are you'll brush in a spray of rugosa roses. The bright blossoms and dense, sturdy foliage of these roses blend so well with the gray shingled houses and windswept bluffs that they might have been designed as part of the place. But even though rugosas are the signature beach rose, they also thrive far from the shore.

As might be expected from a plant that routinely survives New England's ferocious nor'easters, *Rosa rugosa* and its hybrid cultivars share a tolerance for extremes of weather and a resistance to salt. They also shrug off insects and diseases that would leave high strung tea roses reeling.

Named for their "rugose" or crinkled leaves, rugosas are native to Japan, China and Korea. They arrived in Britain during the 1700s and reached North America directly from the Far East (although some people suggest they may have been brought by English colonists) about a century and a half ago. Rugosas are prolific bloomers, and most have an intense, pleasing perfume. Although they usually

RUSS SAYS:
"Over the past 25 years, I suppose I've killed two or three hundred roses. I first encountered rugosas more than two decades ago at the Montreal Botanical Garden and learned on Nantucket that they can stand up to cold and salt yet still provide glorious color. I never had any success with tea roses and other fragile exhibition hybrids—but rugosas thrive year after year."

Rugosas [illegible] the sharp [illegible] Russ [illegible] each summer. Because [illegible] than surface [illegible] their roots [illegible] that stabilize [illegible] sand. Like [illegible] dunes, as they do here along Long Beach on the north side of the island, [illegible] effective as iron bars, but [illegible] thorny rugosas form [illegible] intruder would dare try [illegible]

BY WILLIAM G. SCHELLER PHOTOGRAPHS BY IMKE LASS

With a single row of peony-perfect petals, Nantucket's wild rugosa roses are either the deep-purplish-pink Rubra, top, or the white Alba variety. Hybrids found in the island's gardens exhibit a wide variety of forms—blossoms large and small, single and double, some even resembling tea roses. A few, such as the Dr. Eckener, middle, are yellow. Petals of the white Henry Hudson, bottom, are blushed with pink when the weather's cool.

PHOTOGRAPHS BY MARK LOWE

grow as a shrub, "it's a big shrub, sometimes reaching five by eight or seven by seven feet in size," says Marty McGowan, a Nantucket garden designer. "Some are trailing roses, and some are ramblers, with big canes and climbers shooting out." Plants easily mesh into dense hedges, with crowns expanding 12 to 24 inches a year.

Mid-June to mid-July is the premier rugosa bloom time on the island, exploding in a Fourth of July burst that McGowan says is truly spectacular. Flowering lasts three to six weeks and repeats roughly every 90 days during the season. This translates into two periods of blossoming, often followed by a third "Thanksgiving bloom" not possible so far north without the sea's moderating influence.

Even without blooms, the lush foliage is striking. In many cultivars, leaves turn a range of autumn hues that mimic in miniature the fall display of surrounding trees. Some rugosa varieties are also prolific producers of fruit—beefy, vitamin C–rich "hips." These red or orange seed cases, generally bigger than those of tea roses, are used in traditional recipes for jellies, puddings and teas.

The naturally occurring Asian varieties have a single row of petals, while hybrids come in a wide assortment of styles. Three of McGowan's favorites are good examples. The double blossomed white Blanc Double de Courbet blooms profusely throughout the summer and has few hips. The single-blossomed pink Fru Dagmar Hastrup produces many large, bright-red hips and has vivid fall foliage that ranges from rust to deep purple. The purple crimson Hansa, a double-blossomed variety, has a deep fragrance and is an especially vigorous grower.

Horticulturists working for the Canadian government have done some of the most intensive hybridizing. They spent 30 years developing the popular Explorer series, which flowers even more abundantly than most rugosas. Varieties include the pale-pink-to-white Henry Hudson, the red-violet Charles Albanel, the medium-red David Thompson and the light-pink Martin Frobisher, a nearly thornless plant. Martin Frobisher and David Thompson do not produce hips.

"We set out to develop roses that could be grown in southern Canada with no protection other than natural snow cover-ing," says Ean Ogilvie, one of the Canadian horticulturists. "All are very hardy for the coldest parts of the United States. One, our Jens Munk, grows in Alaska

Rugosas in the Greatandarat family, like this miniature with blossoms only an inch wide, bloom heavily and repeatedly.

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with very satisfactory results."

Veterans of wind blasted beaches and salt-crusted Canadian roadways, rugosas are unfussy in home gardens "Rugosa roses are the right plant for a problem spot," McGowan says "You can put them in a windy corner and let them have full sun They don't need fancy soil—after all, they thrive in sand right on the beach—but you can get incredible growth out of them with a good organic mix, manure and mulch " McGowan also recommends standard organic rose food Good drainage is key—again, remember the characteristics of the sandy, sloping terrain where they do so well

McGowan's rule of thumb for planting rugosas is to space new plants seven feet apart for maximum growth but four to six feet apart for maximum flowering He advises pruning shrub rugosas into sweeping mounds "That's the way to get more flowers and slower overall growth."

And then there is what McGowan calls nature's pruning On Nantucket, as in many semirural environments throughout the country, the deer popu lation has soared Rugosa roses are often cited as unappealing to deer, but they are not immune to the animals' browsing "Deer do most of their dam age in gardens in late winter and early spring," McGowan says "They've exhausted their natural food sources, and gardens offer a smorgasbord of fresh young buds. But deer feed primar ily on the small tips This helps the plant get stronger, with more, rather than larger, blooms—the same effect you'd want from planned pruning "

With roses that need as little care as rugosas, it somehow seems appropri ate that deer do the pruning.

When the beach and a boat beckon, landscaping should take care al itself Once established, rugosa roses da just that.

See Directory on page 135 for details an sources

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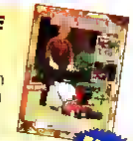

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Nantucketers, wrote Herman Melville, drew their living "from the bottomless deep itself." That's also where they get many of their driveways. Crushed-shell drives are a crisp-looking alternative to gravel or blacktop for island homes, and they hark back to the island's maritime traditions.

they sell sea shells

The leftovers of good chowder make a dreamy driveway

RUSS SAYS:
"A Yankee likes nothing better than to use every part of something. I suspect the first shells used for paving on Nantucket came from the scallop fishery, though scallop shells are less durable than clamshells. We harvest quahogs all summer, and I'm building up my driveway little by little. I've always loved indigenous materials, and I like the faint sea-bottom smell of a shell drive."

The dump truck crawls up the drive, its body tipped back and its tailgate open just enough to release a measured flow of paving material. But don't look for a cascade of crushed stone. This is Nantucket, and Richard Valero is laying down clamshells.

Like a lot of New England traditions, shell drives have practical origins. Back when clams still came to market under sail, householders arrived at the idea of recycling shells as loose paving. Bleached snowy white by the sun and with their characteristic underfoot crunch, shell drives have become as much a part of seacoast life as salt air and squawking gulls.

The drive Valero is installing just outside Nantucket Town had its beginnings in Warren, Rhode Island, at the dockside yards of the Blount Seafood Corp. Blount processes clams on a heroic scale, supplying millions of pounds of clam meat each year to soup manufacturers. A company such as Blount has a major by-product on its hands. The 300,000 pounds of shellfish it takes in on an average day translates into 90 cubic yards of shells. Valero, president of a Nantucket landscaping firm, picks up Blount's shells by the semitrailer load and ferries them to the island, where they spend six to eight months drying—and losing much of their distinctive aroma—before becoming driveways.

Valero likes to begin a shell drive with a 2-inch base layer of tamped stone dust to keep weeds from cropping up and to prevent water from soaking in and creating potholes. Using a dump truck, and with the help of a raking crew to assure even distribution, he then lays down a 3- to 4-inch thickness of shells. The shells settle into place, helped to their final 1½- to 2-inch thickness with a plate compactor, a machine that crushes them and vibrates the paving material into a tighter mass. All that's needed after that is normal automobile traffic (to pack the shell fragments even more tightly) and sunlight, which turns the shells from dingy gray to a bright, clean white in about three weeks.

Figuring the cost of shells, stone dust and installation—and without extras such as steel edging—a 10-foot-wide, 100-foot-long shell drive costs $1,600 to $1,800. There are, of course, other calculations. Crunching numbers instead of shells reveals a 100 foot drive to be the by-product of 66,000 eight-ounce servings of clam chowder.

BY WILLIAM G. SCHELLER
PHOTOGRAPHS BY KELLER & KELLER

MAKING SHELLS LAST
When it comes to durability, shell drives fall somewhat behind more traditional options. A well-drained asphalt drive laid over properly compacted gravel will last 25 to 30 years; pea stone, similarly installed, should be good for 10 to 12 years. As with other paving materials, a shell drive's longevity depends a lot on ground preparation. "If you install a drive over bare soil, you'll probably have to lay down new shells in four or five years," says Richard Valero. "The shells mix in with the soil, especially when the frost melts. But each time you add more shells, the drive becomes firmer." A well-established shell drive, or a new one laid over a bed of tamped stone dust, might last eight years or more without needing replenishment.

See Directory on page 123, for details and sources

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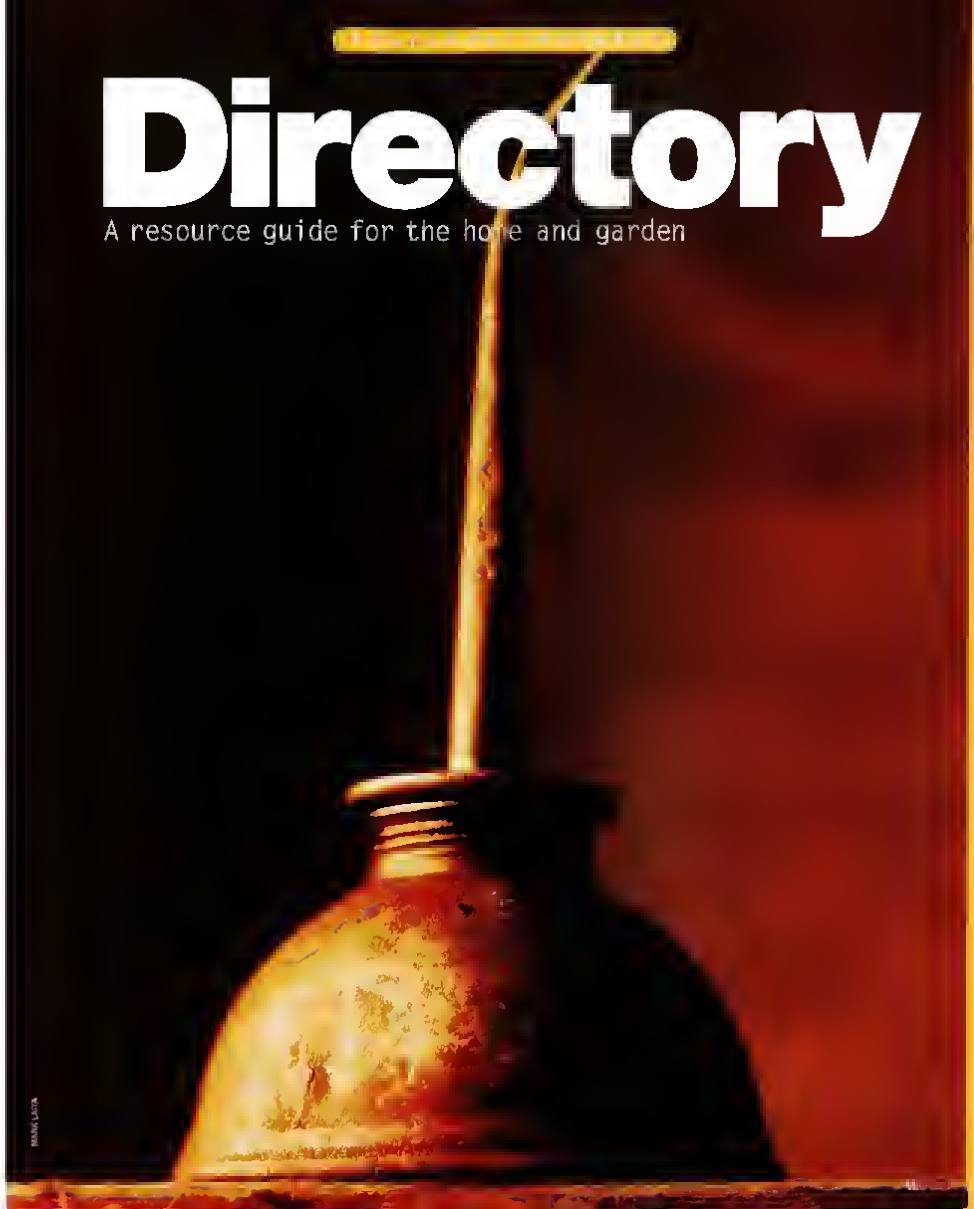

In the next issue of

This Old House

- *Redoing the kitchen, fireplace, front door, siding and family room of this fall's TV project on Nantucket*

An American ***craftsman*** *rebuilds early America's water mills*

Steve Thomas's ice-dam fix. *Traveling to Steve's house to cure a perennial winter dilemma*

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- ***Old-house*** *warranties*
- ***Deer*** *strategy*

On sale October 28

Directory

A listing of goods and services

EXTRAS *pp. 14-19*

p. 14—Pyramid kit: Take An Egyptian Adventure, $25, *Nova Curiosity Kits, Box 811, Cockeysville, MD 21030, 800-584-5487.* **National Institute for Tall People:** Membership included in subscription to monthly newsletter, *The NITPicker*, $25 for 12 issues, *Box 16973, Alexandria, VA 22302-9998, 703-823-0456.* **American National Standards Institute,** *11 W. 42nd St., New York, NY 10036, 212-642-4900.*

p. 15—Utility knives: **Super Heavy Duty Retractable Blade, #10-122,** $15, *Stanley Tools, 600 Myrtle St., New Britain, CT 06053, 800-262-2161.* **Magazine Load Snap-Off Blade Utility Knife, #42048,** $9.98, *Hyde Tools, 54 Eastford Rd., Southbridge, MA 01550, 800-872-4933.* **Contractor Grade Dynagrip Retractable Knife, #10-779,** $8, *Stanley Tools.* **Power-Grip Utility Knife, #7845,** $10.79, *Fiskars Inc., Wallace Div., 780 Carolina St., Sauk City, WI 53583, 800-500-4849.* **"199" Contractor Grade Fixed Blade Knife, #10-209,** $6.50, *Stanley Tools.* **Retractable Banana Knife, #60106,** $19, *Better Tools, Inc., 3030 Centre Pointe Dr., Suite 400, Roseville, MN 55113, 800-798-6657.*

p. 16—Active-noise-reduction headsets: Koss Quiet Zone, #QZ2000, $199, *Koss Corp., 4129 N. Port Washington Ave., Milwaukee, WI 53212, 800-872-5677.* **NoiseBuster,** $149, *Noise Cancellation Technologies, 1 Dock St., Suite 300, Stamford, CT 06902, 800-278-3526.* **Building materials book:** *Twentieth-Century Building Materials: History and Conservation,* ed. by Thomas C. Jester, National Park Service, 1996, 352 pp., $55, *McGraw-Hill Co., 11 W. 19 St., New York, NY 10020, 800-722-4726.* **Metric conversion:** "Metric to Construction," free bimonthly newsletter of the Construction Metrication Council of the National Institute of Building Sciences, *1201 L St., NW, Suite 400, Washington, DC 20005, 202-289-7800, fax 202-289-1092.* The National Institute of Building Sciences is a nonprofit, nongovernmental organization authorized by Congress to serve as an authoritative source on issues of building science and technology.

p. 17—Wood floor: Kentucky Wood Floors, *Box 33276, Louisville, KY 40232, 800-235-5235.* **Weed torch:** BernzOmatic Outdoor Torch, #JT800, $25, *BernzOmatic, 1 BernzOmatic Dr., Medina, NY 14103, 800-654-9011.* **Hailstones:** United Laboratories, *320 37th Ave., St. Charles, IL 60174, 800-323-2594.* **Patent models:** United States Patent Model Foundation, *Box 26065, Alexandria, VA 22313, 703-684-1836.*

p. 18—Tool art: *Tools As Art: The Hechinger Collection,* ed. by Pete Hamill, 1995, 206 pp., $39.95, *Harry N. Abrams, Inc. Publishers, 100 Fifth Ave., New York, NY 10011, 800-288-2131.* **Drywall anchors:** Prices listed by piece unless otherwise specified. **Rawl toggle bolt:** ⅛ in. x 3 in., $50 for 100, *Powers (Rawl) Products, Two Ft. Powers Square, New Rochelle, NY 10802, 800-524-3244.* **Plastic toggle:** ⅛-in., 25 cents; ⅛-in., 28 cents; *Star Expansion Co., Route 32, Mountainville, NY 10953, 800-247-8274.* **E-Z Toggle:** 79 cents, *ITW Buildex, 1349 W. Bryn Maur Ave., Itasca, IL 60143, 800-323-0720.* **Toggle anchor:** ⅛-in. x 3-in., 75 cents, *EZ-T Fastner Co., 3292 S. Bannock St., Englewood, CO 80110, 800-854-3279.* **Four-legged anchor:** ½ in., 39 cents, ¾-in., 51 cents, **Drive anchor:** ¼-in., 61 cents, ⅜-in., 66 cents, **Scru'N'Grip threaded anchors:** plastic, 28 cents; metal, 30 cents, *Star Expansion Co.* **Logs wallboard anchor:** $24 for 100; **Nylon nailins:** ¼ in. x 1 in., $19 for 100, *Powers (Rawl) Products.* **Plastic anchor:** #8, 4 cents, #10, 5 cents, *Star Expansion Co.*

p. 19—PowerGear Limb Lopper Shears, #7972, $24-$29, *Fiskars Inc., 780 Carolina St., Sauk City, WI 53583, 800-500-4849.* **Future Norms:** The Children's Museum, *300 Congress St., Boston, MA 02210, 617-426-6500.*

Our thanks to: Erin McKenny, Joy Mahoney and Peggy Monahan

WGBH Educational Foundation does not endorse any product or service mentioned or advertised in this magazine

Directory

JIGSAWS *pp. 21-24*

Variable-speed orbital-action dustless jigsaw, barrel grip, 1584DVS, $306, top-handle, 1587DVS, $317, *Skil Bosch Power Tool Co., 4300 W. Peterson, Chicago, IL 60646, 800-815-8665.* **Jigsaw blades:** T101B, 4-in. blade for wood, 10 teeth per inch, $8 (5 pack), T101BR, 4-in. down-tooth antisplinter blade, 10 tpi, $9 (5 pack), T101AO, 3-in. blade, 20 tpi, $5 (5 pack), T101A, 4-in. high-speed steel blade, 14 tpi, $13 (5 pack); *Skil Bosch Power Tool Co.* **RemGrit GJ18,** 4-in. flush-cutting blade, medium-grit carbide, $3.64, *Greenfield Ind., Disston Div., Deerfield Industrial Park, S. Deerfield, MA 01373, 800-446-8890.* #12379-J, bayonet-mount scroll blade, 10 tpi, $9.25, *Porter-Cable, 4825 Hwy. 45 North, Jackson, TN 38305, 800-321-9443.* #752221-5, thin-kerf metal-cutting blade, 24 tpi, $8.55 (5 pack), *Makita USA, 14930 Northam St., La Mirada, CA 90638, 800-462-5482.* #30012, 3¼-in. all-purpose blade, 6 tpi, $1.30 (2 pack), *Vermont American Tool, Box 340, Lincolnton, NC 28093-0340, 800-742-3869.* #750008, 3-in. bimetal blade for stainless steel and other metals, 24 tpi, $12.47, #750022, 3-in. blade for plywood and particleboard, 12 tpi, $5.31, *Hitachi Koki USA, 3950 Steve Reynolds Blvd., Norcross, GA 30093, 800-706-7337.*

Our thanks to: Gary Compton, Skil Bosch Power Tool Co., *4300 W. Peterson, Chicago, IL 60646, 800-815-8665.*

HAND SCRAPERS *pp. 25-30*

Sandvik deluxe scraper, #19K01-04, $10.55, Curved scraper blades for hollow and convex shapes, #70K06-02, $10.50 (set of three), **Veritas tribunisher,** #50K03-01, $19.95, 10-in. bastard mill file: #62W13-02, $8.95, **Hard Arkansas slipstone,** #40M07-01, $15.25, *Garrett Wade, 161 Ave. of the Americas, New York, NY 10013-0459, 800-221-2942.*

Further reading: *The Complete Guide to Sharpening,* by Leonard Lee, 1995, 256 pp., $22.95, *The Taunton Press, 63 S. Main St., Box 5507, Newtown, CT 06470-5506, 800-888-8286.*

Our thanks to: Erin Bennet Street School, *39 N. Bennet St., Boston, MA 02113, 617-227-0155, fax 617-227-9292.*

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CROWN MOLDING *pp. 33-41*

Crown molding: B#013 pine crown, $2.27 per lineal ft., custom poplar Hartzwright crown, $1.75 per lineal ft. for 250 feet, custom poplar pencil bead crown, $1.38 per lueal ft. for 250 feet; *Concord Lumber Corp., 55 White St., Littleton, MA 01460, 508-369-3640.* Miter saw: C15FB Hitachi 15 in., $1,346; *Hitachi Koki USA, 3950 Steve Reynolds Blvd., Norcross, GA 30093, 800-706-7337.* Coping saw: Disston #15, $5.90; *Greenfield Ind., Disston Div., Deerfield Industrial Park, S. Deerfield, MA 01373, 800-446-8890.* File: Nicholson 8 in. four in hand rasp, $9.82; *Cooper Tools, 1000 Lufkin Rd., Apex, NC 27502, 919-781-7200.* Air nail gun: Airy #8TK0241 Brad Gun, $109.$119; *Airy Sales Corp., 1425 S. Allec St., Anaheim, CA 932805, 800-999-9195.*

Our thanks to: Bernie dellenedetto Custom Woodworking, *7 Blueberry Lane, Hopkinton, MA 01748, 508-435-6924;* Rick Ursch, manager, *Littleton Millworks, 542 Newton Rd., Littleton, MA 01460, 508-486-0761.*

CAULK *pp. 43-46*

Silicone-acrylic latex: Original Formula "3006" All Purpose Adhesive Caulk, $1.69 $2.69 per 10-oz. tube; *White Lightning, 725 Reco Dr., Lawrenceville, GA 30245, 800-241-5295.* Butyl rubber: Dap Butyl FlexCaulk, $2.49 $2.99 per 10.1-oz. tube; *DAP Inc., Box 277, Dayton, OH 45401, 800-327-3333.* Silicone: Chem Calk1200, $4.97 per 10.3-oz. tube; *Bostik, Boston St., Middleton, MA 01949, 800-726-7845.* Polysulfide: Life-Calk, $13.85 per 10.6-oz. tube; *Life Industries Corp., 2081 Bridgeview Dr., N. Charleston, SC 29405, 803-566-1225.* Polyurethane: Starbrite #200 Quick Cure Marine, $11.85 per 10.2-oz. tube; *Starbrite, 4041 SW 47th Ave., Fort Lauderdale, FL 33314, 800-327-8583.* Paintable silicone sealant: Dap Trade Mate II, $4.99 per 10.1-oz. tube; *DAP, Inc.* Latex: Everette Painter's Latex Caulk, $1.25 per 10.3-oz. tube, *Franklin International, 2020 Bruck St., Columbus, OH 43207, 800-669-4583.* Acrylic latex: Elmer's Weather-Tite Acrylic Latex Caulk, $3 per 10.5-oz. tube, *Elmer's Products Inc., 180 E. Broad St., Columbus, OH 43215, 800-848-9400.* Mortar: Mortar Patch, $3.27 per 10.1-oz. tube; *Mack Ianburg Duncan Co., Box 25188, Oklahoma City, OK 73125-0188, 800-654-8454.* Asphalt: Everlite Blacktop Repair, $1.90 $2.25 per 10.3-oz. tube; *Franklin International.* Removable: Dap Seal N' Peel Removable Weather Strip Caulk, $3.49 $3.99 per 10.3-oz. tube, *DAP, Inc.* Fibrous insulation: #6 Mastic, $2.45 $3.35 per 11-oz. tube, Metal duct: #8 Mastic, $2.60 $3 per 11-oz. tube; *RCD Corp., Box 1020, Eustis, FL 32727-1020, 800-854-7494.* Firestop: Flame-X SP, $10.70 per 10.3-oz. tube; *Firestop Systems Inc., 12187 Industrial Rd., Surrey, BC V3V-3S1, Canada, 800-810-1788.* Marine and deck: Sikaflex 290DC, $14.15 per 10.5 oz. tube; *Sika Corp., 22211 Telegraph Rd., Southfield, MI 48034, 810-353-2150.* Gutter: Gutter & Foundation Sealant, $3.45 per 10.1 oz. tube, *Red Devil, 2400 Vauxhall Rd., Union, NJ 07083, 800-423-3845.* Roof: Dap Black Tite Asphalt Based Roof Sealant, $2.49 $2.99 per 10.3-oz. tube; *DAP Inc.* Glazing: Liquid Nails Glazing Sealant (GC-17), $2.19 per 10.3-oz. tube, *Macco Adhesives, 925 Euclid Ave., Cleveland, OH 44115, 800-634-0015.* Color: Phenoseal Colortones Kitchen & Bath Sealant, $4.50 per 6-oz. tube; *Gloucester Co., Inc., Box 428, Franklin, MA 02038, 800-343-4963.* Tub and tile: Polyseamseal Tub & Tile Adhesive Caulk, $3.91 per 10-oz. tube; *Darworth Co., 7405 Production Dr., Mentor, OH 44060, 800-624-7767.* Precaulking backer: Caulking Rod, 20'x¾", $2.77, *Macklanburg Duncan Co.* Solid silicone: Sil-Span Ribbon, $1.56 per ft., depending on width; *Pecora Corp., 165 Wambold Rd., Harleysville, PA 19438, 800-523-6688.*

For more information: Sealant, Waterproofing and Restoration Institute, *3101 Broadway, Suite 585, Kansas City, MO 64111, 816-561-8230.*

Our thanks to: Karen Kramer, *Adhesives & Sealants Industry Magazine, Box 400, Flossmoor, IL 60422, 708-922-0761.* Jerome Klosowski, senior scientist, C043C1, Dow Corning Corp., *2200 W. Salzburg Rd., Auburn, MI 48611, 517-496-4244.*

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EXTENSION CORDS *pp. 49-52*

Green: Carol FrogHide Ultra Flex, #06450, 50 ft., $24.99, Yellow (with lighted connector end): Carol Lifetime Plus Extension Cord 3-Conductor, #03387, 25 ft., $14.49, Blue: Carol All-Weather Power-Center, #00791, 25 ft., $23.59, Circuit breaker: Carol No Over-Load Power Center 3-Conductor, #03212, 2 ft., $13.99; *General Cable Corp., 4 Tesseneer Dr., Highland Heights, KY 41076-8458, 800-438-7314.* GFCI: Shock Shield Tri-Cord Set, #148#0-506, 6 ft., $39.95, *Technology Research Corp., 5250 140th Ave. N., Clearwater, FL 34620-9940; 800-780-4324.*

Further reading: *Audel Practical Electricity,* by Robert Middleton, revised by L. Donald Meyers, 1988, 512 pp., $19.95, *Macmillan Publishing Co., 201 W. 103rd St., Indianapolis, IN 46290; 800-428-5331.* *Basic Wiring,* by the editors of Sunset Books, 1995, 96 pp., $9.95, *dist. by Little Brown & Co., 34 Beacon St., Boston, MA 02108, 800-759-0190.*

Our thanks to: Paul Hedrick, technical director, Cordset and Assembly Div., General Cable Corp.; Dave Mercier, applications engineering manager, Southwire Co., *Box 1000, One Southwire Dr., Carrollton, GA 30119-0001, 800-444-1700.*

BUYER'S AGENTS *pp. 55-56*

Further reading: *Your New House,* by Alan and Denise Fields, 1995, 258 pp., $11.95, *Windsor Peak Press, 1223 Peakview, Suite 9000, Boulder, CO 80132, 800-888-0385.* *Not One Dollar More! How to Save $3,000 to $30,000 Buying Your Next Home,* by Joseph Eamon Cummins, 1995, 260 pp., $17.95, *Kells Media Group, Box 60, Oceanville, NJ 08231, 800-875-1995.* *Who Represents You When You Buy A Home?,* National Association of Real Estate Buyer's Brokers (NAREBB), *1070 Sixth Ave., Suite 307, Belmont, CA 94002-3867, 415-591-5446.*

Our thanks to: Richard Hogue, Buyer's Resource Real Estate, *6099 S. Quebec St., Suite 200, Englewood, CO 80111, 800-428-9377.* Tom Hathaway, The Buyer's Agent, *1255 Lynnfield, Suite 273, Memphis, TN 38119, 901-767-1077.* Raymond Stoklosa, president, NAREBB. Frank Cook, Real Estate Intelligence Reports, *Box 5702, Portsmouth, NH 03802, 800-239-9961.*

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AN AMERICAN CRAFTSMAN *pp. 64-69*

Inlaid floors. Chuck Crispin, *Legendary Hardwood Floors, 601 S. 21st St., Terre Haute, IN 47803, 800 588 3372*

For more information: National Wood Flooring Association, *233 Old Meramec Station Rd., Manchester, MO 63021, 800-422 4556, help line 500-443-9663 (25 cents per min.)*

Further reading. *Wood Flooring: A Lifetime of Beauty*, free brochure from the National Wood Flooring Association. *Hardwood Floors* magazine, *1846 Hoffman St., Madison, WI 53704, 608 249 0186*

Our thanks to: The Troyer Group, *415 Lincolnway East, Mishawaka, IN 46544, 219 259 9976*. Eden Design Associates Inc., *111 Congressional Blvd., Suite 120, Carmel, IN 46032, 317 843 5790*. Tom and Sharon Fortenbery, Joyce Meissel, Tim and Carol Fears, Allen Pyne, Leonard Hower.

SHELLAC *pp. 70-78*

Dry shellac. Button lac, B700 BLAC5 (darkest, useful for matching antique finishes), $26.69 per lb., A.C. Garnet, B700 00AC5 (reddish), $20.29 per lb., Orange, B700 AS015 (most commonly used), $19.95 per lb., Super Blonde, B700 SUP15 (nearly clear), $32.89 per lb., Behkol proprietary solvent, B650-2816, $6.29 per qt., *H. Behlen & Bro., 4715 State Hwy. 30, Amsterdam, NY 12010, 800 545 0047*

Our thanks to: Kuldip Bahl and M.S. Grover and their families, of Ranchi, India. Shyam Sunder Saraogi and family of Khunti, India. Sushil Kumar Saraf, chairman, Shellac Export Promotion Council, *14/1B Ezra St., Calcutta 700-001, India*. S.C. Agarwal, director, Indian Lac Research Institute, *PO Namkum, Ranchi 834 010, India*. William H. Galland, Islip, NY. Jeffrey C. Flath, Mantrose-Bradshaw Zinsser Group, *113 Olive St., Attleboro, MA 02703, 508 222 3710*. Robert Senior, president, and Debra Fedasiuk, public relations, Wm. Zinsser & Co., *173 Belmont Dr., Somerset, NJ 08875 1285, 800-899-1211*

NANTUCKET INSPECTION *pp. 80-87*

John F. Gifford, designer, Design Associates, *15 Main St., Nantucket, MA 02554, 508-228-4342*. Bruce Kiffen, contractor, *36½ Cliff Rd., Nantucket, MA 02554, 508 228 1485*. Nantucket Historical Association, *Box 1016, Nantucket, MA 02554, 508-228-1894*.

Our thanks to: John Sydney Conway, Nantucket, MA.

Directory

STONE WALLS *pp. 88-93*

Donkey trough pump, #88204, Aquarius 6, 245 gal. per hour, $100. Nozzle, #88107, ½" Frothy, $30. *OASE Pumps, 17322 Murphy Ave., Irvine, CA 92714, 800 365 3880*

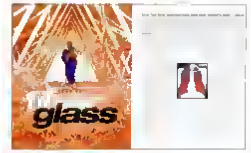
Further reading: *Building With Stone*, by Charles McRaven, 1989, 190 pp., $14.95. *Building Stone Walls*, by John Vivian, 1976, 108 pp., $8.95. *Garden Way Publishing, Schoolhouse Rd., Pownal, VT 05261, 800 441-5700. Building Fences of Wood, Stone, Metal & Plants*, by John Vivian, 192 pp., $13.95, *Williamson Publishing, Box 185, Charlotte, VT 05445, 800-234 8791*

CONCORD BARN *pp. 94-99*

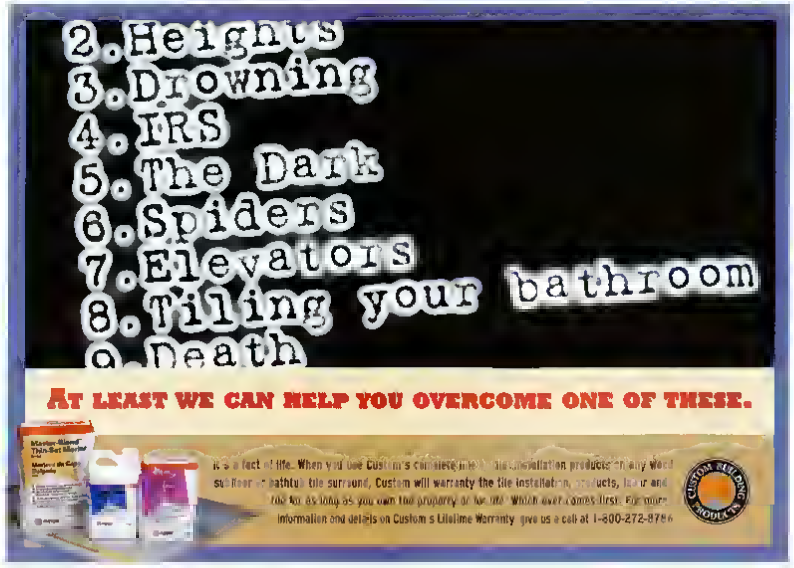
Further reading: *The Timber Frame Home: Design, Construction, Finishing*, by Tedd Benson, 1988, 225 pp., $24.95, *The Taunton Press, 63 S. Main St., Box 5507, Newtown, CT 06470-5506, 800-888 8286*

Our thanks to: Lynn and Barbara Wickwire, Concord, MA.

FIBERGLASS *pp. 100-105*



Duct board: SuperDuct, 73 cents per sq. ft., *Schuller Int'l Inc., Mechanical & Specialty Insulations, Box 625005, Littleton, CO 80162-5005, 800 368-4431*. ToughGard fiberglass duct board, $24 per 4'x10' sheet, *CertainTeed Corp., Insulation Group, Swedesford Rd., Box 860, Valley Forge, PA 19482, 800-441 6720*. Fiberglass insulation: Pink Plus with Miraflex fiber, 16" width, $11 per roll, 23" width, $16.50, Pink Plus, 16" width, $9.90, 23" width, $14.95, *Owens Corning Fiberglas Corp., Fiberglas Tower, Toledo, OH 43659, 800-766-3464*. Fiberglass wall and floor insulation, #GPF 454, $22 per 64"x15"x39'2" roll, *Georgia Pacific, 2300 Windy Ridge Pkwy., Atlanta, GA 30339, 800 839 2588*. Alternative insulation products: Polyurethane foam board.



FIBERGLASS *continued*

Cotbond, #0 cents per 1" x1 x1', *Cotbond Corp , 32404 Frontage Rd., Bozeman MT 59715; 406 586 4585* Cotton batts and blown-in cotton Greenwood Cotton Insulation, #R11, 18 cents per 1 x1 x3½", *Greenwood Industries, Box 1017, Greenwood, SC 29648, 800-546-1332* Cellulose Nature Guard Insulation, 12 cents per sq ft , *Louisiana Pacific 7825 Trade St , San Diego CA 92121, 800-917-2077* Polyicynene foam Icynene, $1 25 $2 per sq ft., installed; *Icynene Inc , 376 Wathne Ave , Mississauga, Ontario, Canada L4Z 1X2, 800-758 7325* Cement foam Air Krete, $1 40 per sq ft , installed; *Air Krete Inc , Box 380, Weedsport, NY 13166-0380, dist by Ceretech, Inc , Box 535, Andover, NY 14806; 800-597-8737* Expanded polystyrene boards CelloFoam, $5.25 per 1"x4 x8', *CelloFoam North America, Inc , Box 406 Conyers, GA 30207; 800-241-3634* Extruded polystyrene foam boards AmoFoam (available through contractor); *Amoco Foam Products Co , 2907 Log Cabin Dr , Smyrna, GA 30080 7013 800-241-4402.* Polyisocyanurate foam board NRG, 40 cents per sq ft for wall panels and $1 per sq ft for roof panels (contractors' cost), *NRG Barriers, The E NRG Y House, 27 Pearl St , Portland, ME 04101, 800-343 1285*

For further reading: "Fibrous Glass and Cancer," by Peter E Infante, Loretta D Schuman, John Dement and James Huff, *American Journal of Industrial Medicine, 1994, 26 559-584,* for reprints write *Peter F Infante, Health Standards Program, Occupational Safety and Health Administration, U S Dept of Labor, Washington, DC 20210* "The State of the Workplace," edited by Mark Nicas, Joan Spinson and Will Forest, *May Day, 1990,* an internal bulletin from the *Hazard and Evaluation System and Information Service, California Dept of Health Services, 2151 Berkeley Way, Room 504, Berkeley, CA 94704 510 540 2115*

For more information North American Insulation Manufacturers Assoc , *44 Canal Center Plaza, Suite 310, Alexandria, VA 22314, 703 684 0084* Victims of Fiberglass, *Box 162646, Sacramento, CA 95816-2646, 916-452 2834*

Our thanks to: John Lemery, Builders Insulation of Maine Inc , *79 Lincoln St , S Portland, ME 04106, 207-799 4717*

TILE ROOF *pp. 106-111*

Tiles: French fox red; Spanish F 12 with Brookville green glaze, Conoseta unglazed, French lavender glass; Dresden with combed surface, *The Tile Man, Route 6, Box 494-C, Lousburg, NC 27549, 919 853 6923* No minimum Colonial shingle with lichen, ornamental hip starter *The Roof Tile and Slate Co , 1209 Carroll, Carrollton, TX 75006, 800-446 0220* Gothic and combination natural-clay red, Spanish S tile, Gothic French with Brookville green glaze *Renaissance Roofing, Box 5024 Rockford IL 61125, 800 699-5695*

Further reading: "The Preservation and Repair of Historic Clay Tile Roofs," by A E Grimmer and P K Williams, *Preservation Briefs No. 30, U S Dept of Interior, Nat'l Park Service, Box 37127, Washington, DC 20013, 202-208 7394.*

Our thanks to: Andrew Taurosa, *Bryn Maur Roofing, 100 Bryn Maur Ave , Lavallete, NJ 08735, 908 793-1912* Stuart Matthews, Northern Roof Tile Sales Co , *4408 Milestrip Rd , Suite 266 Blasdell, NY 14219, 905 627-4035* Melvin Mann, Tile Search Inc., *Box 580, 216 James St , Roanoke, TX 76262, 817 491-2444* George Davidson, Materiales de Construcion, *784 Chelham Way, Santa Barbara, CA 93108; 805 969 1874* Peggy Damson, London Tile, *65 Walnut St , New London, OH 44851, 419 929 1551* Gladding, McBean and Co , *Box 97, Lincoln, CA 95648, 916-645-3341* Ludowici Roof Tile, *4757 Tile Plant Rd , Box 69, New Lexington, OH 43764, 800-945-8453* V Lester Yuritch Co Inc , *811 Church Rd , Cherry Hill, NJ 08002, 609-663-3549*

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Further reading: "The Preservation and Repair of Historic Clay Tile Roofs," by A E Grimmer and P K Williams, *Preservation Briefs No. 30, U S Dept of Interior, Nat'l Park Service, Box 37127, Washington, DC 20013, 202-208 7394.*

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NANTUCKET *p. 112*

Further reading: *Building with Nantucket in Mind: Guidelines for Protecting the Historic Architecture and Landscape of Nantucket Island,* by J Christopher Lang and Kate Stout, 1996, 184 pp., $10, *Nantucket Historic District Commission, 37 Washington St., Nantucket, MA 02554, 508 228 7231; fax 508-325 7572. Nantucket Island Guidebook,* by George Graham Trask, 1994, 126 pp , $8 95, *Coastal Village Press, 3502 W Boundry St , Beaufort, SC 29902, 803-524-0075 Nantucket Gardens and Houses,* by Virginia Scott Heard and Taylor Lewis, 1990, 230 pp , $50, *Little Brown & Co , 134 Beacon St., Boston, MA 02108, 800-759 0190 Nantucket Doorways: Thresholds to the Past* by Edouard A Stackpole and Melvin B Summerfield, 1992, 152 pp , $2 95, *Madison Books, 4720 Boston Way, Lanham, MD 20706, 800-462-6420 Guide to Nantucket (sixth ed.),* by Polly Burroughs, 1994, 210 pp , $12 95, *The Globe Pequot Press Box 833 Old Saybrook, CT 06475, 800 243 0495*

Our thanks to: Dick Mackey, author of *Nantucket! Nantucket! Nantucket! An Insider's Guide (1981),* for the line drawing reproduced on page 112.

Nantucket Poster: *H. Marshall Gardiner's Nantucket Post Cards (1910 1940)* (reproductions of historic hand-tinted color postcards of the island), by Gerald Gardiner Salisbury, 1995, 195 pp , 89 plates, $24 98, available from *Logos Bookstore 15 Washington St., Nantucket, MA 02554, 800-585 6467. Early Nantucket and its Whale Houses,* by Henry C. Forman, 1991, 256 pp , $29 95, *Mill Hill Press, dist by Parnassus Imprints, 30 Perseverance Way, Suite 7, Hyannis MA 02601, 508 790 1175*

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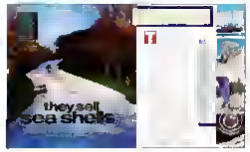
Directory

RUGOSA ROSES *pp. 114-116*

Nurseries that carry rugosa roses: Royal River Roses, catalog, $3, *70 New Gloucester Rd., N. Yarmouth, ME 04097, 207-829-5830.* The Roserie at Bayfields, free catalog, *Box R, Waldoboro, ME 04572, 207-832-6330, toll-free fax 800-933-4508.* Lowe's (Owu Root) Roses, catalog $3, *6 Sheffield Rd., Nashua, NH 03062, 603-888-2214.* Antique Rose Emporium, catalog $5, *9300 Lueckemeyer Rd., Brenham, TX 77833, 800-441-0002.* Heirloom Old Gardeu Roses, catalog $5, *24062 Riverside Dr. NE, St. Paul, OR 97137, 503-538-1576.*

For further readiug: *Rosa Rugosa*, by Suzanne Verner, 1991, 90 pp., $22.95, *Capability's Books, 2379 Hwy. 46, Deer Park, WI 54007, 800-247-8154.*

SHELL DRIVE *pp. 120-121*



Clamshell driveway: Valero & Sons, *60 Old S. Road, Nantucket, MA 02554, 508-228-2397.* Shells: Blount Seafood Corp., minimum order 2 cubic yards; *Box 327, Warren, RI 02885.*

SAVE THIS OLD HOUSE *p. 152*

Our thanks to: Karen Kiehna Oliver, executive director, Historic Petersburg Foundation, *326 Grove Ave., Petersburg, VA 23803, 804-732-2096.* Julie Vosmik, director, Capital Regional Office, Virginia Dept. of Historic Resources, *221 Governor St., Richmond, VA 23219, 804-225-4252.*

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The Concord Barn

Can the team save a dying building?

This Old House CLASSICS

Week 1

(September 21-22) Steve Thomas hosts his first ever *This Old House* broadcast in the fall of 1996. The project: the renovation of Lynn and Barbara Wickwire's Concord, Massachusetts, barn. The couple's plan—to modernize the interior while preserving the traditional New England structure—is cast u doubt as soon as master carpenter Norm Abram and contractor Tom Silva take a look at the place. The timber frame shows signs of rot, the tin roof is "cooked" and the floor is dangerously weak. Even the rubblestone foundation is crumbling in spots. The Wickwires' dream of sprucing up the barn—on a $250,000 budget—is starting to look like a nightmare.

Week 2

(September 28-29) Careful inspectiou confirms Norm's worst fears. Declaring the barn's condition "much worse than we ever thought," he and Tom begin stripping off the roof and walls. Ideally, the structure will yield enough usable materials to form the basis for a new barn on the site. In the meantime, the Wickwires agree to meet with architectural designer Jock Gifford, who has done several similar conversations. Their request: design a barn that preserves the look and feel of the original.

Week 3

(October 5-6) With only the frame left standing, Steve examines the pile of salvaged wood: three posts, two plate boards and a partially rotten roof rafter. Even he has to admit that the Wickwires' dream is fading fast. To evaluate the soundness of the timbers that remain, the crew calls in master framer Tedd Benson. His verdict: The posts and beams are too far gone. The barn has got to come down. And come down it does. Benson's team hammers out a few pegs, cuts a handful of braces and gets out of the way as the structure collapses. If the Wickwires still want their barn, Benson makes them an unusual—and affordable—offer: He'll hold a timber framing class on the site, and at the end of a week, there will be a new barn to raise, the old-fashioned way.

Week 4

(October 12-13) Gifford and the Wickwires have settled on a design. The great room, with its 36-foot ceiling, will front on the street, where passersby will see what looks like a traditional New England barn. In the rear, windows will give the Wickwires views of their beloved pond. Back at the site, plumbing and heating contractor Richard Trethewey goes over the installation of the septic system and the drilling for a well, while Norm and Tom ready the foundation—which in places is eight inches out of level—to accept the new post-and-beam structure.

Week 5

(October 19-20) Steve visits Benson Woodworking in Alstead, New Hampshire, where the timbers for the new barn are taking shape. Here, traditional craftsmanship exists alongside modern electronics. Computers calculate complex measurements and power saws make precision cuts, but every mortise and tenon is finished by hand. The timbers are chamfered, beaded and rubbed with tung oil before being shipped to Concord, where student framers from across the country will gather to build the Wickwires' home.

Week 6

(October 26-27) The work site looks like a scene from 100 years ago as the framers, surrounded by stacks of pine timbers, get their instructions from Benson. Volunteers—among them a dancer, a clothing retailer and an electrical engineer—prepare to spend the next week building the frame, then raising it with pike poles and muscle.

Coming Next Issue

(November 2-3) The barn raising.

Beginning this fall, vintage This Old House episodes will be rebroadcast every week on these commercial stations around the nation

ALABAMA
Huntsville
WHNT-TV*

ALASKA
Anchorage
KIMO-TV
Sat., 1:30pm
Fairbanks
KATN-TV
Sun., 5pm
Juneau
KJUD-TV

ARIZONA
Phoenix
KPHO-TV
Sat., 10am
Tucson
KTTU-TV
Sat., 9am

CALIFORNIA
Chico
KRCR-TV
Sun., 5pm
Eureka
KAEF-TV
Sun., 5pm
Fresno
KJEO-TV*
Los Angeles
KABC-TV
Sun., 7:30am
Monterey
KCBA-TV
Sun., 10:30am
Sacramento
KPWB-TV
Sun., 7am
San Diego
KGTV-TV
Sat., 4pm
San Francisco
KPIX-TV
Sun., 10am
Santa Barbara
KSBY-TV
Sun., 3pm

COLORADO
Colorado Springs
KRDO-TV
Sun., 11:30am
Denver
KCNC-TV
Sat., 10:30am
Grand Junction
KJCT-TV
Sun., 11:30am

CONNECTICUT
Hartford
WTIC-TV
Sun., 12:30pm

DISTRICT OF COLUMBIA
WUSA-TV
Sun., 6am

FLORIDA
Fort Myers
WTVK-TV
Sat., 11:30am
Jacksonville
WTLV-TV
Sat., 7:30am
Miami
WPLG-TV
Sun., 8:30am
Orlando
WFTV-TV
Sat., 9am
Sarasota
WWSB-TV
Sun., 11:30am
Tampa
WFTS-TV
Sun., 8:30am
West Palm Beach
WPEC-TV
Sun., 11am

GEORGIA
Albany
WCTV-TV
Sat., 10:30am
Atlanta
WXIA-TV
Sun., 6:30am
Macon
WMAZ-TV
Sat., 11am
Savannah
WTOC-TV
Sun., 5pm

HAWAII
Honolulu
KHNL-TV
Sat., 4:30pm

IDAHO
Boise
KNIN-TV
Sun., 10:30am

ILLINOIS
Champaign
WICS-TV
Sat., 7:30am
Chicago
WBBM-TV*
Rockford
WTVO-TV
Sat., 6pm
Springfield
WICS-TV
Sat., 7:30am

INDIANA
Evansville
WTVW-TV
Sun., 9:30am
Indianapolis
WNDY-TV
Sat., 11:30am
South Bend
WHME-TV
Sat., 1:30pm

IOWA
Cedar Rapids
KWWL-TV*
Ottumwa
KYOU-TV
Sun., 5:30pm

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Wichita
KSNW-TV
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Sun., 6:30am
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WNOL-TV
Shreveport
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Bangor
WVII-TV
Sun., 12pm
Portland
WPXT-TV
Sun., 11am

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WMAR-TV
Sun., 7am

MASSACHUSETTS
Boston
WFXT-TV
Sun., 11am

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WDIV-TV*
Flint
WNEM-TV
Sun., 5am
Grand Rapids
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MINNESOTA
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Sat., 9am
Rochester
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Sat., 5pm
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KETV-TV
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KTNV-TV*
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KRNV-TV*

CONTINUED ON NEXT PAGE

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This Old House CLASSICS

The Concord Barn

Remembering the joys and terrore of e favorite project

Tedd Beneon:

What Tedd Benson remembers most about the Concord project is "the way in we brought e group oi people together who weren't necessarily familiar with timber frame construct on and engaged them in the process. All the participants really had to lay down any personal agenda oi personal interest that they might heve had to make their role as e team player successful."

Under Benson's tuteiage, volunteer and student framers from around the country cut and raised the timbers by hand in less than e week. There were surprsingly few problems. His biggest fear: "that we would lift those large purlin plates up to the top of the building...and they wouldn t fit." Because of the demands of the TV schedule...the crew didn't do e dry run on the ground. "We ran out of time," Benson says. "It added to the drama of the day, and I'm glad." He's also pleased that the series is being shown again. "I think the viewing public was really taken by what happened. The drama was real; the risk was real. The fact that we were reaching came across. The feedback I got was, Boy, that was wonderful; that was great to watch."

Framer Tedd Benson can read the history of a building in its timbers. After examining the original barn, he describes its construction to Steve Thomas, left, and Norm Abram.

While he has continued to work with *This Old House*, Benson doesn't see a future for himself on the small screen. "Viewers can see that I'm not terribly comfortable in front of the camera," he says. "The way director Russ Morash would probably put it—Russ being the expert—is, You d better keep your day job."

Steve Thomas:

For Steve Thomas, the Concord project was his first as host of *This Old House*. And...he says, a great way to start out. "We all had a sense of participating in something that was really unique...something you couldn't do every day." Although he admits to being "terrified," he also had an advantage. A former marine carpenter and professional sailor with more than 30,000 blue-water miles behind him, Thomas felt at home amid the barn's massive timbers. "The structure had resonance for me," he says. The soaring frame reminded him of the 103-foot wooden schooner that had been one of his last homes on the water. In the years since, Thomas has gotten used to being on camera. But no project has yet equaled the thrill of Concord. "The barn raising created an opportunity for community that people don't seem to have anymore," he says. "All of us were touched by that." —**Laura Goldstein**

Where and when to see the episodes

NEW MEXICO
Albuquerque
KOB TV
Sat 4pm

NEW YORK
Binghamton
WBNG TV
Sat 7:30am
Buffalo
WIVB-TV*
New York
WCBS-TV
Sun 7:30am
Syracuse
WTVH TV
Sun 11:30am
Watertown
WWNY TV
Sat 7:30 m

NORTH CAROLINA
Charlotte
WBTV-TV
Sun 1:30pm
Greensboro
WGHP TV
Sun. 8am
Greenville
WLOS/WFBC TV*
Raleigh
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Sun 10am

OHIO
Cincinnati
WCPO TV
Sun 6am
Cleveland
WEWS TV
Sat 4:30am
Columbus
WSYX TV*
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OKLAHOMA
Oklahoma City
KOCO TV
Sat 10am
Tulsa
KJRH TV
Sat 10:30am

OREGON
Eugene
KLZI TV
Sun 5pm
Medford
KOBI/KOTI TV
Sun 4pm
Portland
KOIN TV
Sun 10:30am

PENNSYLVANIA
Erie
WUET TV
Sat 6:30am
Harrisburg
WPMT TV
Sat 10:30pm
Philadelphia
WCAU TV
Sun 11:30am
Wilkes Barre
WYOU TV
Sat 12:30pm

RHODE ISLAND
Providence
WJAR TV

SOUTH CAROLINA
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WCSC TV*
Florence
WWMB-TV
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Greenville
WYOS TV*
Myrtle Beach
WPDE/WWMB TV*

SOUTH DAKOTA
Sioux Falls
KDLT TV
Sun 9am

TENNESSEE
Chattanooga
WDEF TV
Sun 7am
Knoxville
WATE TV
Sun 5:30am
Memphis
WFTV/WLMT TV
Sun 11:30am
Nashville
WKRN TV
Sat 6am

TEXAS
Amarillo
KFDA TV
Sat 5pm
Beaumont
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Houston
KTRK TV
Sun 11am
Lubbock
KLBK TV
Sun 5pm
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KLSB TV*
Tyler
KETK TV
Sat 5pm
Waco
KXXV TV
Sun 10:30am

UTAH
Salt Lake City
KUTV TV
Sun 8:30

VERMONT
Burlington
WCAX TV
Sat 11am

VIRGINIA
Norfolk
WVEC TV
Sun 11am
Richmond
WAWB-TV
Sat 5pm
Roanoke
WSLS-TV
Sun 6:30pm

WASHINGTON
Seattle
KIRO TV
Sat 10:30am
Spokane
KXLY TV
Sun 9:30a m

WEST VIRGINIA
Bluefield
WOAY TV*
Charleston
WCHS-TV*
Clarksburg
WDTV TV
Sat 6:30pm
Parkersburg
WTAP TV*
Wheeling
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Green Bay
WGBA TV
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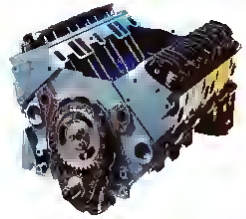

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Dothan
WDIQ TV
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Mount Cheaha
WCIQ TV
Thu 8:00pm Sat 8pm

ALASKA
Anchorage
KAKM TV
Mon 6pm Sat 9:30am
Bethel
KYUK TV
Fri 9am and 8pm
Sat 8am
Fairbanks
KUAC TV
Fri 8pm, Sat 8am
Juneau
KTOO-TV
Fri 8pm, Sat 8am

ARIZONA
Phoenix
KAET TV
Sat 12pm
Tucson
KUAS-TV
Sat 11:30am and 6:00pm
KUAT TV
Sun 11:00am and 6:30pm

ARKANSAS
Arkadelphia
KETG TV
Sat 10pm Sun 10pm
Fayetteville
KAFT TV
Sat 12pm Sun 1:00pm
Jonesboro
KTEJ TV
Sat 12pm Sun 5:30pm
Little Rock
KETS TV
Sat 12pm Sun 5:30pm
Mountain View
KEMV TV
Sat 12pm Sun 5:30pm

CALIFORNIA
Eureka
KEET TV
Wed 7:30pm, Sat 10:30am
Fresno
KVPT TV
Sat 9:30am Sun 7pm
Huntington Beach
KOCE TV
Sat 4:30pm
Los Angeles
KCET TV
Sat 5:00pm
Redding
KIXE TV
Sat 1:30pm
Redwood Park
KRCB-TV
Wed 12pm Sun 7:30pm
Sacramento
KVIE TV
Thu 8pm Sat 3:30pm
San Bernardino
KVCR TV
Thu 8pm
San Diego
KPBS TV
Sat 11am
San Francisco
KQED TV
Thu 8:00pm Sat 8pm
San Jose
KTEH TV
Wed 9pm, Sat 3pm
Sun 5:00pm
San Mateo
KCSM TV
Wed 6:30pm Sat 9:30am
Sun 9am

COLOKADO
Boulder
KBDI TV
Mon 10pm, Wed 5:30pm
Sat 5:30pm Sun 4pm
Denver
KRMA TV
Sat 2:30pm, Sun 5:30pm
Pueblo
KTSC TV
Thu 8:00pm Sat 11:00pm

CORRECTICUT
Fairfield
WEDW TV
Tue 12pm Thu 11pm
Sat 8pm, Sun 10:30am
Hartford
WEDH TV
Tue 12pm Thu 11pm
Sat 8pm Sun 10:30am
New Haven
WEDY TV
Tue 12pm Thu 11pm
Sat 8pm, Sun 10:30am
Norwich
WEDN TV
Tue 12pm Thu 11pm
Sat 8pm Sun 10:30am

DISTRICT OF COLUMBIA
WETA TV
Sun 7:00pm and 9:30pm

FLORIDA
Daytona Beach
WCFE TV
Tue 9pm Sat 6pm
Fort Myers/Naples
WGCU TV
Sat 12pm Sun 1:00pm
Gainesville
WUFT TV
Sat 12pm Sun 5:30pm
Jacksonville
WJCT TV
Sat 2:30pm
Miami
WPBT TV
Sat 12pm Sun 5:30pm
Orlando
WMFE TV
Sat 9am and 1:30pm
Sun 9am
Pensacola
WSRE TV
Sat 12:30pm
Tampa
WEDU TV
Sat 11:30am, Sun 7pm
WUSF TV
Wed 9pm Sun 5:30pm

GEORGIA
Athens
WGTV TV
Sat 5:30pm, Sun 8pm
WPBA TV
Mon 8pm, Wed 2pm
Sat 6pm
Chatsworth
WCLP TV
Sat 5:30pm, Sun 8pm
Cochran
WDCO TV
Sat 5:30pm, Sun 8pm
Columbus
WJSP TV
Sat 5:30pm Sun 8pm
Dawson
WACS TV
Sat 1:30pm Sun 8pm
Pelham
WABW TV
Sat 1:30pm Sun 8pm
Savannah
WVAN TV
Sat 1:30pm Sun 8pm
Waycross
WXGA TV
Sat 5:30pm, Sun 8pm
Weens
WCES TV
Sat 1:30pm Sun 8pm

HAWAII
Honolulu
KHET TV
Thu 7:30pm, Sun 4:30pm

IDARO
Boise
KAID-TV
Sun 4:30pm
Coeur d'Alene
KCDT TV
Sun 3:30pm
Moscow
KUID TV
Sun 3:30pm
Pocatello
KISU TV
Sun 4:30pm
Twin Falls
KMPT TV
Sun 4:30pm

ILLINOIS
Carbondale
WSIU TV
Thu 7pm Sat 12:30pm
Chicago
WTTW TV
Tue 7:00pm Sat 12:30pm
Jacksonville
WSEC TV
Tue 11pm Sun 1:30pm
Macomb
WIPE TV
Thu 11pm Sun 1:30pm
Moline
WQPT TV
Fri 7pm, Sat 5:30pm
Olney
WUSI TV
Thu 7pm Sat 12:30pm
Peoria
WTVP TV
Thu 10pm, Sat 12:00pm
Quincy
WQEC TV
Thu 10pm, Sun 1:30pm
Urbana
WILL TV
Thu 7:00pm Sun 3:30pm

IRDIANA
Bloomington
WIIC TV
Mon 5pm Thu 11pm
Sat 12:30pm
Evansville
WNIN TV
Sat 12:30pm and 6pm
Sun 1:30pm
Fort Wayne
WFWA TV
Sat 10am and 3pm
Indianapolis
WFYI TV
Sat 10am Sun 7pm
Merrillville
WYIN TV
Wed 9pm, Thurs. 8:30am
Muncie
WIPB TV
Thu 8pm Sun 4:30pm
South Bend
WNIT TV
Fri 10:30am Sun 2pm
Vincennes
WVUT TV
Sun 12:30pm

IOWA
Des Moines
KDES TV
Fri 6:30pm, Sat 1:30pm
Fort Dodge
KTIN TV
Fri 6:30pm, Sat 1:30pm
Iowa City
KIIN TV
Fri 6:30pm, Sat 1:30pm
Mason City
KYIN TV
Fri 6:30pm Sat 1:30pm
Omaha
KDIN TV (Council Bluffs)
Fri 6:30pm Sat 1:30pm
Red Oak
KIIN TV
Fri 6:30pm Sat 1:30pm
Sioux City
KSIN TV
Fri 6:30pm Sat 1:30pm
Waterloo
KWPT TV
Fri 6:30pm Sat 1:30pm

KARSAS
Bunker Hill
KOOD TV
Thu 7pm Sat 12:30pm
Colby
KAWK TV
Thu 7pm Sat 12:30pm
Topeka
KTWU TV
Sat 9:30am
Wichita
KPTS TV
Sun 11:00am Sun 11am

KERTUCKY
Ashland
WKAS TV
Sun 1pm
Bowling Green
WKGB-TV
Mon 6:30pm
WKYU TV
Tue 1pm Mon 6-30pm
Covington
WCVN TV
Sun 5pm
Elizabethtown
WKZT TV
Sun 5pm
Hazard
WKHA TV
Sun 1pm
Lexington
WKLE TV
Sun 1pm
Louisville
WKAU TV
Sun 3pm
WKPC TV
Wed 1:30pm Sat 1:30pm
Sun 3pm
Madisonville
WKMA TV
Sun 4pm
Morehead
WKMR TV
Sun 1pm
Murray
WKMU TV
Sun 4pm
Owensboro
WKOH TV
Sun 4pm
Owenton
WKON TV
Sun 5pm
Paducah
WKPD TV
Sun 4pm
Pikeville
WKH TV
Sun 5pm
Somerset
WKSO TV
Sun 5pm

LOUISIARA
Alexandria
KLSA TV
Sat 4pm Sun 10am
Baton Rouge
WYPB TV
Sat 4pm Sun 11am
Lafayette
KLPB TV
Sat 4pm Sun 10am
Lake Charles
KLTL TV
Sat 4pm Sun 10am
Monroe
KLTM TV
Sat 4pm Sun 10am
New Orleans
WYES TV
Sat 8:30am
Shreveport
KLTS-TV
Sat 4pm Sun 11am

MAIRE
Bangor
WMEB TV
Sat 1:30pm
Calais
WMED TV
Sat 1:30pm
Lewiston
WCBB TV
Sat 1:30pm
Portland
WMEA TV
Sat 1:30pm
Presque Isle
WMEM TV
Sun 10am

MARYLAND
Annapolis
WMPT TV
Sat 4:30pm Sun 6:30pm
Baltimore
WMPB-TV
Sat 4:30pm, Sun 6:30pm
Frederick
WHFT TV
Sat 4:30pm Sun 6:30pm
Hagerstown
WWPB TV
Sat 4:30pm Sun 6:30pm
Oakland
WEPT TV
Sat 4:30pm Sun 6:30pm
Salisbury
WCPB TV
Sat 4:30pm, Sun 6:30pm

MASSACRUSETTS
Boston
WGBH TV
Thu 8pm Sun 11pm
WGBX TV
Mon 9pm Sun 9am
and 12:30pm
Springfield
WEDO TV
Thu 8pm Sat 11:00pm

MICHIGAN
Alpena
WCML TV
Sat 2:30pm
Bad Axe
WHS TV
Tue 8:30pm Sun 5pm
Cadillac
WTAV TV
Sat 2:30pm
Detroit
WTVS-TV
Sat 10am
East Lansing
WKAR TV
Thu 9pm Sat 1:00pm
Sun 1pm
Flint
WTUS TV
Thu 9pm Sat 1:00pm
Grand Rapids
WCSG TV
Thu 8:00pm Sat 10am
Kalamazoo
WLNS TV
Thu 8:30pm, Sat 11am
Manistee
WCMW TV
Sat 2:30pm
Marquette
WNMU TV
Sat 1:30pm
Mount Pleasant
WCML TV
Sat 3:30pm
University Center
WUCM TV
Thu 8:00pm Sat 5pm

MIRRESOTA
Appleton
KWCM TV
Thurs 8pm, Sat 12:00pm
Austin
KSMQ TV
Sat 12:00pm, Sun 1pm
Bemidji
KAWE TV
Sat 12:30pm
Brainerd
KAWB-TV
Thurs 7:30pm, Sat 12:30pm
Duluth
WDSE TV
Sat 6:30pm, Sun 9:30am
Saint Paul/
Minneapolis
KTCA TV
Wed 8pm Sat 6:00pm

MISSISSIPPI
Biloxi
WMAH TV
Sat 7pm
Booneville
WMAE TV
Sat 7pm
Buide
WMAU TV
Sat 7pm
Greenwood
WMAO TV
Sat 7pm
Jackson
WMAA TV
Sat 7pm
Meridian
WMAW TV
Sat 7pm
Mississippi State
WMAB TV
Sat 7pm

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- Skylights
- Shower Enclosures
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- Restaurants
- Hotels

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Stained Glass Overlay

Oxford
WMAV TV
Sat 7pm

MISSOURI
Joplin
KOZJ TV
Sat 12:30pm
Kansas City
KCPT TV
Thu, 7:30pm, Sat. 12:30pm
Saint Louis
KETC TV
Wed. 12:30pm, Sat. 6:30pm
Sedalia
KMOS-TV
Sat 12:30pm
Springfield
KOZK TV
Sat 12 30pm

MONTANA
Bozeman
KUSM TV
Sat 11:30am

NEBRASKA
Alliance
KTNE TV
Sat 10:30am and 5:30pm
Bassett
KMNE TV
Sat 10:30am and 5:30pm
Hastings
KHNE TV
Sat 5:30pm and 10pm
Lexington
KLNE-TV
Sat 10am and 5:30pm
Lincoln
KUON TV
Sat 10am and 5pm
Merriman
KRNE TV
Sat 9am and 4:30pm
Norfolk
KXNE-TV
Sat 10am and 5:30pm
North Platte
KPNE TV
Sat 10am and 5:30pm
Omaha
KYNE TV
Sat 10am and 5:30pm

NEVADA
Las Vegas
KLVX TV
Sat 9am
Reno
KNPB TV
Sat 10:30am and 1pm

NEW HAMPSHIRE
Durham
WENH TV
Thu 8:30pm, Sun 10am
Keene
WEKW TV
Thu 8:30pm, Sun 10am
Littleton
WLED TV
Thu 8:30pm, Sun 10am

NEW JERSEY
Camden
WNJS TV
Tue 8pm, Sat. 8pm
Sun. 5:30pm
Montclair
WNJN TV
Tue 8pm, Sat. 8pm
Sun 5:30pm
New Brunswick
WNJB-TV
Tue 8pm, Sat 8pm
Sun 5:30pm
Trenton
WNJT TV
Tue 8pm Sat 8pm
Sun 5:30pm

NEW MEXICO
Albuquerque
KNME TV
Thu 7pm, Sun 10a m
Las Cruces
KRWG-TV
Sat 11:30am
Portales
KENW TV
Sat 3:30pm

NEW YORK
Binghamton
WSKG TV
Sat 1:30pm
Buffalo
WNED TV
Sat 10:30am
WNEQ TV
Sun 7pm
Long Island
WLIW TV
Thu 8:30pm, Sat 10:30am
Sun 8pm
New York
WNET TV
Sat. 5:30pm
Norwood
WNPI TV
Sat 10:30am
Plattsburgh
WCFE TV
Sun 11:30am
Rochester
WXXI TV
Sat 10:30am, Sun. 5:30pm
Schenectady
WMHT TV
Tue 1:30pm, Sat 10:30am
Syracuse
WCNY TV
Thu 8pm Sat 10:30am
Watertown
WNPE TV
Sat 10:30am

NORTH CAROLINA
Asheville
WUNF TV
Sat. 5:30pm, Sun. 9am
Chapel Hill
WUNC TV
Sat 5:30pm Sun 9am
Charlotte
WTVI TV
Tue 12:30pm Thu 8pm
Sat 5pm, Sun. 9am
WUNG-TV
Sat 5:30pm, Sun. 9am
Columbia
WUND TV
Sat. 5:30pm Sun. 9am
Greensville
WUNK TV
Sat 5:30pm Sun 9am
Jacksonville
WUNK TV
Sat. 5:30pm Sun. 9am
Linville
WUNE TV
Sat 5:30pm Sun 9am
Roanoke Rapids
WUNP TV
Sat 5:30pm, Sun. 9am
Wilmington
WUNJ TV
Sat 5:30pm, Sun 9am
Winston-Salem
WUNI TV
Sat 5:30pm, Sun 9am

NORTH DAKOTA
Bismarck
KBME TV
Mon 10pm, Tue 10pm
Wed 10pm Thu 7pm
and 10pm, Sat 6pm
Dickinson
KDSE TV
Mon 10pm Tue 10pm
Wed 10pm, Thu 7pm
and 10pm Sat 6pm
Ellendale
KJRE TV
Mon 10pm, Tue 10pm
Wed 10pm Thu 7pm
and 10pm Sat 6pm
Fargo
KFME TV
Mon 10pm Tue 10pm
Wed. 10pm Thu 7pm
and 10pm..Sat 6pm
Grand Forks
KGFE TV
Mon 10pm Tue. 10pm
Wed 10pm Thu 7pm
and 10pm Sat. 6pm
Minot
KSRE TV
Mon. 10pm, Tue. 10pm
Wed 10pm, Thu 7pm
and 10pm, Sat. 6pm
Williston
KWSE TV
Mon 10pm, Tue. 10pm
Wed 10pm Thu 7pm
and 10pm Sat. 6pm

OHIO
Akron
WEAO-TV
Sat 10:30am and 5pm
Sun 6pm
Athens
WOUB-TV
Wed 1:30pm Sat 5pm
Bowling Green
WBGU TV
Mon 3pm Sat. 1:30pm
Cambridge
WOUC TV
Wed 1:30pm, Sat. 5pm
Cincinnati
WCET TV
Thu 8pm, Sat. 9am and
6pm
Cleveland
WVIZ TV
Tue 7:30pm, Sat 1pm
Sun 12:30pm
Columbus
WOSU TV
Thu 8pm, Sat 4:30pm
Dayton
WPTD TV
Thu. 8pm, Sat. 9:30am
Sun. 12pm
Portsmouth
WPBO TV
Thu 8pm Sat. 4.30pm
Toledo
WGTE-TV
Thu. 8pm Sat. 1pm
Sun 1pm
Youngstown
WNEO-TV
Sat 10:30am and 5pm
Sun 6pm

OKLAHOMA
Cheyenne
KWET TV
Sat 9:30am and 12:30pm
Sun. 3pm
Enfaula
KOET TV
Sat. 9:30am and 12.30pm
Sun 3pm
Oklahoma City
KETA TV
Sat 9:30am and 12:30pm
Sun 3pm
Tulsa
KOED TV
Sat. 9.30am and 12:30pm
Sun 3pm

OREGON
Bend
KOAB-TV
Thu 8pm, Sat 5pm
Corvallis
KOAC TV
Thu 8pm Sat 5pm
Eugene
KEPB TV
Thu 8pm Sat 5pm
Klemath Falls
KFTS-TV
Thurs 8pm Sat. 10:30pm
La Grande
KTVR TV
Thu. 8pm Sat. 5pm
Medford
KSYS TV
Thu 8pm
Portland
KOPB-TV
Thu 8pm..Sat 5pm

PENNSYLVANIA
Allentown
WLVT TV
Fri 7:30pm Sat 6pm
Erie
WQLN TV
Sat 6:30pm
Harrisburg
WITF TV
Thu 8pm Sat 6pm
Philadelphia
WHYY TV
Tue 7pm Sat 11am
Pittsburgh
WQED TV
Sat 6:30pm
WQEX TV
Wed 8:30pm Sun 11am
Pittston
WVIA TV
Thu 7pm, Sat. 11am
and 5pm
University Park
WPSX TV
Sat 5p m Sun 4:30pm

RHODE ISLAND
Providence
WSBE TV
Tue 8:30pm Sun 6pm

SOUTH CAROLINA
Allendale
WEBA TV
Sat 1:30pm
Beaufort
WJWJ TV
Sat. 1:30pm
Charleston
WITV TV
Sat. 1:30pm
Columbia
WRLK TV
Sat 1:30pm
Conway
WHMC TV
Sat 1:30pm
Florence
WJPM TV
Sat 1:30pm
Greenville
WNTV TV
Sat 1:30pm
Greenwood
WNEH TV
Sat 1:30pm
Rock Hill
WNSC-TV
Sat 1:30pm
Spartanburg
WRET TV
Sat 1:30pm
Sumter
WRJA-TV
Sat 1:30pm

SOUTH DAKOTA
Aberdeen
KDSD-TV
Sat 4:30pm
Brookings
KESD-TV
Sat 4:30pm
Eagle Butte
KPSD TV
Sat 3:30pm
Lowry
KQSD-TV
Sat. 4.30pm
Martin
KZSD TV
Sat 3:30pm
Pierre
KTSD-TV
Sat 4:30pm
Rapid City
KHSD TV
Sat 3:30pm
Sioux Falls
KCSD TV
Sat 4:30pm
Vermillion
KUSD TV
Sat 4:30pm

TENNESSEE
Chattanooga
WTCI TV
Sat 5:30pm
Cookeville
WCTE-TV
Sat. 12.30pm
Knoxville
WKOP TV
Sat 1:30pm
WSJK TV
Sat 1:30pm
Lexington
WLJT TV
Thu 7:30pm Sat 12:30pm
Memphis
WKNO TV
Thu 7:30pm Fri 12pm
Sat 9:30am
Nashville
WDCN TV
Sat 4:30pm

TEXAS
Amarillo
KACV TV
Sat 12.30pm
Austin
KLRU TV
Sat 5:30pm
College Station
KAMU TV
Sat 12.30pm
Corpus Christi
KEDT TV
Sat 12:30pm and 9pm
Dallas/Fort Worth
KERA TV
Sat 9am and 6:30pm
El Paso
KCOS-TV
Tues 7pm
Harlingen
KMBH TV
Sat 12.30pm
Houston
KUHT TV
Mon 1:30pm
Sun. 11:30am
Killeen
KNCT TV
Sat 12.30pm, Sun. 9:30am
Lubbock
KTXT TV
Sat 12.30pm
Odessa
KOCV TV
Tue 12pm Sun 12:30pm
San Antonio
KLRN TV
Sat 5:30pm
Waco
KCTF-TV
Mon 12:30pm, Sat 9am
and 6:30pm

UTAH
Provo
KBYU-TV
Sat. 9:30am and 12pm
Salt Lake City
KUED TV
Sat 5am and 5pm

VERMONT
Burlington
WETK TV
Thu 8pm, Sat. 11am
Rutland
WVER TV
Thu 8pm Sat 11am
Saint Johnsbury
WVTB-TV
Thu 8pm..Sat. 11am
Windsor
WVTA TV
Thu 8pm..Sat 11am

VIRGINIA
Charlottesville
WHTJ TV
Sat 8.30am
Falls Church
WNVT TV
Sat 3pm
Harrisonburg
WVPT TV
Sat. 1.30pm, Sun. 10.30am
Marion
WMSY TV
Sat. 1.30pm
Norfolk
WHRO TV
Thu 8pm Sat 8.30am
and 2pm
Norton
WSBN TV
Sat 1.30pm
Richmond
WCVE TV
Sat 8.30am
WCVW TV
Fri 8.30pm
Roanoke
WBRA TV
Sat 1.30pm

WASHINGTON
Centralia
KCKA TV
Thu 6.30pm, Sat. 12.30pm
Pullman
KWSU TV
Mon 7:30am,
Wed 7:30am, Sat, 2pm
Richland
KTNW TV
Thu 7pm, Sat. 2pm
Sun 4.30pm
Seattle
KCTS-TV
Sun 5pm
Spokane
KSPS TV
Sat. 9.30am Sun 5.30pm
Tacoma
KBTC TV
Thu 6:30pm Sat 12:30pm
Yakima
KYVE TV
Sun 5p m

WEST VIRGINIA
Beckley
WSWP TV
Sat 1.30pm
Huntington
WPBY TV
Sat 1.30pm
Morgantown
WNPB TV
Sun 7pm

WISCONSIN
Green Bay
WPNE TV
Wed. 7pm, Sun. 4pm
La Crosse
WHLA TV
Wed 7pm, Sun. 4pm
Madison
WHA TV
Wed 7pm Sun 4pm
Menomonie
WHWC TV
Wed 7pm Sun 4pm
Milwaukee
WMVS-TV
Thu 7.30pm, Sat. 8am
Park Falls
WLSE TV
Wed 7pm, Sun. 4pm
Wausau
WHAM TV
Wed 7pm, Sun 4pm

WYOMING
Riverton
KCWC TV
Sat. 12pm and 5pm

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5 Trim mat at baseboard and window
6 Trim mat at outlets switches etc.
7 Apply second coat of saturant to wet mat.
8. Apply 1st coat of saturant at adjacent area.
9 Apply mat to 2nd area, overlapping by 4"
10.Cut down center of overlap (both layers)
11 Remove mat strips on neat sides of cut.
12 Apply 2nd coat of saturant (include seam)

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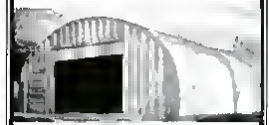

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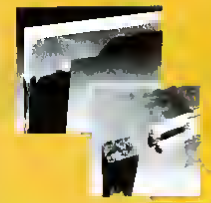

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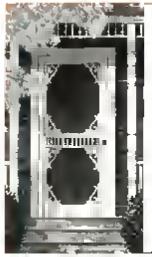

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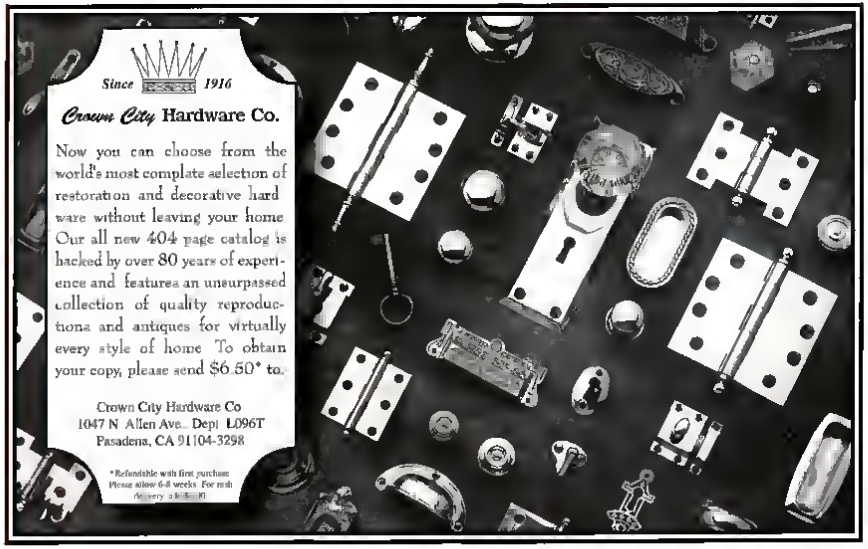

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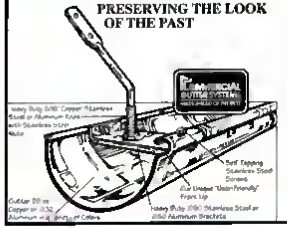

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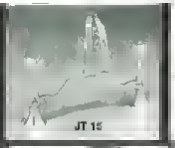

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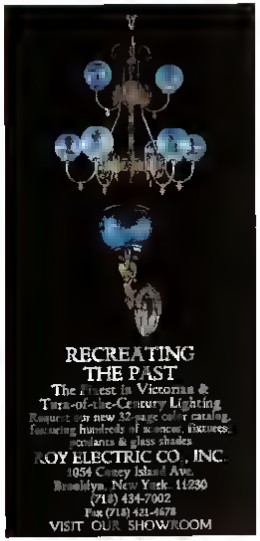

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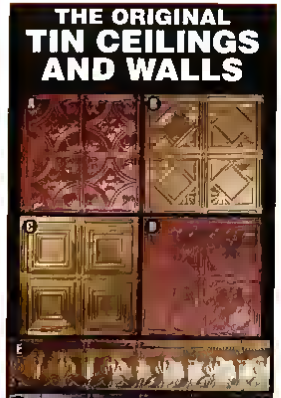

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CONTACT

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